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LOOKING AHEAD
... with the Editor

DR. G. S. HUME, geologist for the Oil Controller for Canada, is of the opinion that among oil operators and geologists, there may have been more of a tendency to look for similar structural features elsewhere than examine the regional characters which provided the necessary conditions for oil accumulation of which Turner Valley, in the province of Alberta, is only one field.

Working from this conclusion and believing that some of the best oil prospecting ground in Alberta adjoins Turner Valley. Dr. Hume will outline in an early issue of THE OIL WEEKLY the features of Turner Valley. His approach is a picture of the local area in relation to the larger regional structure.

THE OIL MAN'S CALENDAR

JUNE 13–14	Spring Meeting, Southwestern District, API, Division of Production, Rice Hotel, Houston.
16	Pennsylvania Grade Crude Oil Association, William Penn Hotel, Pittsburgh.
24	Kentucky Oil and Gas Association, Mid-Year Meeting, Hotel Lafayette, Lexington.
OCT. 3– 4	American Association of Oil Well Drilling Contractors, Blackstone Hotel, Fort Worth.
12–13	Texas Mid-Continent Oil & Gas Association, Houston.
23–25	Fifteenth Annual Meeting, IPA, Dallas, Texas.
NOV. 13–16	American Petroleum Institute, Stevens Hotel, Chicago.

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The Changing Panorama

Industrial Efficiency Aided by War Ideas

PEACETIME application of war developments are due to have important effects on industry. Many technical improvements will increase efficiency in machinery operation to augment output and lower production costs.

Recent severe Navy tests of diesel-engine filters, for instance, have revealed that new detergent, or additive-type lubricants have largely solved the problem of keeping engines clean; filtration now serves chiefly to remove abrasives. The Navy now uses four standard filter sizes, two large and two small, instead of the more than 40 varieties once installed. Abrasives are maintained at lowest concentration by circulating oil through filter elements at the highest practical rate possible with "shunt" operation, high oil temperatures, and a high pressure drop across the filter element.

Also it has been found by the Army that 35-cetane-number diesel fuels may be used satisfactorily in normal temperatures and altitudes. Even at sub-zero temperatures, automotive diesels can be operated on these fuels.

Likewise, it has been suggested that the time has come for integrating superchargers with high-speed diesels to take full advantage of their potentialities for making possible more compact and lighter engines.

Jet cooling of pistons recently was recommended to SAE National-Diesel Fuels and Lubricants Meeting in New York, as a promising method of combating excessive combustion temperatures which have hampered progress toward increasing the power output and reducing the weight of internal-combustion engines.

"Three factors combine to make Americans stand out as discoverers and developers of oil in the earth up to the present. These factors are:

"1. A distinctive flare for effective team work between science and industry which arises out of the American concept of the dignity of labor.

"2. The freedom from political and social barriers to widespread exploration for oil beneath the surface of the earth in the United States.

"3. The adventurous, chance-taking spirit of the pioneer which pervades America and has impelled Americans to drill thousands of wells every year in search for oil."

OIL IN THE EARTH, *by Wallace E. Pratt*

"An armored division gets only 21 feet per gallon of gas . . . requires 25,000 gallons to move 100 miles—

"To train a pilot uses up more gasoline than the average motorist would buy in 18 years . . . 12,500 gallons—

"Every soldier abroad requires 50 gallons of petroleum products a month—

"For the invasion of North Africa, 65 percent of the total tonnage of supplies was petroleum—

"In one hour, a Flying Fortress burns up enough gasoline to last the average car owner about 6 months . . . or to take him from New York to Hollywood and half way back again."

THE PETROLEUM INDUSTRY'S PART IN THE GASOLINE CONSERVATION DRIVE, PIWC.

Getting Veterans Back on the Job

DEFINITE reemployment plans for returning ex-servicemen should be an objective of every organization in the country, large or small, that has had employes in the armed forces. Discharged soldiers and sailors have a right to their former jobs, under the law. However, the initiative for getting these boys back into their former places should come from the companies; and notable examples are being set by some organizations.

Westinghouse Electric and Manufacturing Company, for example, has in operation a program aimed at employing every veteran possible. This program provides for the following measures to be taken in all of the company's principal plants:

1. Assign an industrial-relations representative to be responsible for reestablishment of returning veterans, coordinating the services of the employment, training and medical departments and shop and office supervisors.

2. Survey all positions in the plants, listing all types of work which can be performed by people with various physical handicaps.

3. Designate a physician in the medical department to be responsible for thorough physical examination of all returning veterans and to supervise special medical attention and consultation required by disabled veterans.

4. Assure continuous service credit for time spent in the armed forces by employe veterans.

5. Make every effort to place returning employe veterans who are able to work on the employment rolls at once.

6. Maintain close contact with local and state agencies involved in the welfare of returning veterans.

Freight Cars Can Also Fight

A COMPANY-WIDE campaign to speed the loading and unloading of railroad cars, by Westinghouse Electric and Manufacturing Company, last year, made available 1000 extra car days a month to other wartime shippers.

"Over the period of the year that amounted to releasing 12,000 cars working for one day or 12 cars working for 1000 days," an executive stated at a recent ceremony honoring members of the traffic and shipping departments.

It was explained that an important result in hastening the "turnaround" of railroad cars was a drastic reduction in demurrage. In this respect, cost during 1943 was cut to less than a sixth of the demurrage in 1942 despite the fact that increased war production made necessary the handling of considerably more freight.

Great Prospects For Postwar Oil

THERE are reasons for believing that an unprecedented postwar market for oil will exist in foreign countries. During the next 25 years the use of petroleum in foreign areas may reach proportions heretofore undreamed of.

Mechanized warfare is teaching the value of motorized vehicles as nothing else could have done. Many peoples are becoming familiar with trucks and airplanes who never before thought of using them. Many countries are to have larger manufacturing capacities, which will require more petroleum. The task of rebuilding devastated Europe will require large quantities of oil.

Another factor is the development of roads in many remote countries, such as the trans-Iranian highway connecting the Persian Gulf with southern Russia, the Ledo and Burma roads from India to China, the Alcan highway from the United States across Canada to Alaska, and hundreds of other less known routes. These roadways will be used in the development of these countries. At the same time, new airways are being blazed around the world.

All this adds up to oil consumption far in excess of prewar use. Consumption of petroleum amounts to 450 gallons annually per capita in the United

States, compared with 15 gallons per person for the rest of the world, or one thirtieth that of the United States. If the consuming rate of the rest of the world should rise to the present level of the United States—an unlikely development—20 billion barrels of petroleum would be needed annually. But even if consumption outside of the United States increases to a point equal to only a tenth of our per capita use, world oil demand would amount annually to more than 3¼ billion barrels in contrast with 2¼ billion in 1941.

Oil Outstanding in Support of Military

COMMANDER John E. Kirkpatrick of the United States Navy, on leave at his home in Oklahoma City, had this to say concerning the effectiveness of the United States oil industry after observing its results at first hand in both the Atlantic and Pacific war theaters:

"One of America's most marked advantages in the winning of the Pacific war is the effectiveness of the oil industry back home and its development of the fuels and lubricants so badly needed there. The quality has never fallen short of expectations and lots of times American forces have run out of everything else, but they have always had the most essential product—oil.

"Submarine operations against the Japs and its increased effectiveness emphasizes this advantage. As the war continues, our oil requirements will necessarily become more and more severe because of increased forces to supply and the greater distances for operations of these forces."

Commander Kirkpatrick saw action on Guadalcanal and Tarawa.

"The cream of the crude oil contains many important components of the gasoline we use in our automobiles. Yet 'fighting fuels' such as high-octane aviation gasoline, the toluene for TNT, and the butadiene for synthetic rubber, are all derived from the cream of the crude oil.

"As the war progresses, we are stepping up production of these fighting fuels. And as production is stepped up, the bigger the bite the refiner has to take out of each barrel of crude oil to make these war products, and the less is available for manufacture into automotive gasoline.

"In addition, the demand for fuel oil for our expanding Navy, for our growing Merchant Marine, for our thousands of war factories and railroads is constantly increasing. Some of the components of fuel oil also go into automotive gasoline. Thus the greater the demands on the fuel oil, the less ordinary automotive gasoline can be produced."

GASOLINE CONSERVATION, A BOOKLET ISSUED BY OWI, PAW, OPA AND ODT.

Postwar Competition In Foreign Countries

A GENERAL stimulation of economic progress would result throughout the world if all nations were to do away with artificial restraints on production and distribution. Thus, in the opinion of Ralph W. Gallagher, president of Standard Oil Company (New Jersey), the main problem confronting American foreign trade is the difficulty companies have in determining postwar procedures because they are subject to two sets of laws—laws of the United States and laws of foreign countries where they do business. Governmental action is necessary to clarify the situation, according to Gallagher.

His own company, he said, believes in free competition in business, and he added: "We do not believe in agreements which fix prices, allocate markets, or restrict production, except where production is controlled to conserve natural resources."

Appearing before the O'Mahoney subcommittee of the Senate committee on the judiciary, Gallagher suggested that the O'Mahoney bill now pending before the committee, might be improved by providing that copies of all agreements by American nationals, or by corporations more than 50 percent owned by American corporations, which restrict production of allocated territories, fields or markets, be filed with the government. If it were in the public interest, filed agreements might be published, except for trade secrets, prices and financial terms and other data, disclosure of which would handicap Americans in competition with foreign interests. The government might be granted power to issue "cease and desist" orders with respect to any filed agreements after notice and hearing and subject to usual court review.

"But whatever roads other nations may take," he advised, "the United States should find means consistent with the welfare of our own country which will enable American business men legally to compete abroad on an equal footing with the nationals of other countries."

Pardon My (Hic) Smoke

FARM Bloc senators and crop-conscious advocates from the Middle West who have long advocated a compulsory addition of alcohol to gasoline used for automobile fuel may find the theoretical excess of agricultural alcohol burned in the internal-combustion engine without previous admixture in the fuel tank, with the admittedly serious drawbacks to such a blended fuel.

Outlook for alcohol consumption in the plane, truck and car motor takes color from what the newspaper accounts have heralded as the use of "water" as engine fuel to give additional pick-up or emergency burst of speed to fighter planes. The "water" used, according to what little information has been released by military authorities, is a blend of alcohol and water, in proportions regulated by the combustion chamber heat in each type of engine.

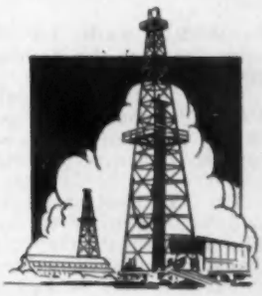
Admission of a fine spray of water or the alcohol-water blend into the incandescent-fired charge in an engine cylinder tends to cushion the shock of the explosion. This is done partly through dissociation of the water and subsequent recombustion and partly through the formation of steam which expands rapidly and extends the "push" on the piston past the working limits of the burning fuel mixture. Addition of alcohol to the water for this cushioning effect gives a relatively slow-burning fuel which will ignite after the gasoline vapor, if sufficient air be present to support extended combustion. This likewise stretches the power impulse over more than the relatively instantaneous detonation of the hydrocarbon-air mixture.

Use of the alcohol-water blend for cushioning will make possible the use of fuels with much lower octane rating than now demanded by high-compression automotive power plants, and thus offers a means of supplementing the present relatively restricted amount of motor fuel which can be refined from a barrel of a given crude.

From the point of application of the automotive industry, the injection method of applying the alcohol-water "cushion" promises a much more easily regulated addition of alcohol to the fuel supply than does the formerly advocated plan of mixing alcohol with the gasoline. Too, the filling station is relieved of paying internal revenue on spirituous liquors in addition to the many present taxes which it must compute and remit.

A paint, composed of crushed industrial garnets in a vehicle of non-flammable resin, and developed to provide a non-slip footing at gun emplacements and other exposed spots on shipboard, offers a solution of the problem posed by steel equipment flush with the floor on the drilling derrick. Bonding firmly on steel, wood and concrete, the paint is better than the roughened equipment surface, in that it may be renewed when necessary, and does not glaze or soften.

WASHINGTON ROUNDUP



By BERTRAM F. LINZ, Washington Correspondent

CONGRESSIONAL activities affecting the oil industry continued heavy in Washington last week, with developments on both sides of the Capitol.

PAW Funds Reduced—PAW appropriations were sharply pared by the House appropriations committee which, after refusing a $480,000 increase sought for a proposed expansion of personnel, cut $70,000 off the amount provided for this year and limited the agency to $6,000,000 for the year which will begin July 1.

Interior Appropriations Upped—Interior Department appropriations, after being cut by the House, were increased by the Senate, which provided an additional $1,075,000 for a test of Alaskan oil resources, restored a cut of $14,000 in the fund for enforcement of the Connally hot-oil act, made available the first $8,000,000 on the department's $30,000,000 investigation of synthetic liquid fuel production, and allowed an additional $80,000 for Bureau of Mines studies on the improvement of base stocks for aviation gasoline and the de-sulphuring of sour crudes, together with $500,000 for stimulation of secondary-recovery production.

Hearing on Cartels—The Senate judiciary committee opened hearings on safeguards against postwar international cartels. With Ralph W. Gallagher, president of Standard Oil Company (New Jersey), the first witness, approving the underlying principle but not all of the provisions of the O'Mahoney bill requiring registration with the Department of Justice of all international business agreements.

Elk Hills Unit Operation—The House Naval affairs committee sent to the floor new legislation authorizing unit operation of Naval Reserve No. 1 under which production will be increased from 15,000 to 65,000 barrels a day, with 30,000,000 barrels to be withdrawn during the next 18 months, and the Senate Naval affairs committee began its own study of the legislation, being told that both the Navy and Standard Oil Company of California were agreeable to the restrictions which it is proposed to have Congress place on administration and production of the Elk Hills field.

Alien Stock Seized—Standard Oil Company (New Jersey) also figured in an action by the Alien Property Custodian, who seized patents and stock of three corporations formed by the company and I G Farbenindustrie under their prewar cartel agreement.

More Oil Conversations—At the State Department, officials were awaiting arrival of another British delegation to resume the Anglo-American oil conversations held last month, but resigned to a delay should the invasion of Europe get under way before the group leaves London.

Need for Deferment of Derrickmen Is Stressed

The urgency of placing derrickmen on the list of critical occupations was emphasized at a meeting in Washington recently when the Sub-Committee on Manpower, District 3, PIWC, Production Committee discussed manpower problems of the oil industry with PAW, Selective Service and the War Manpower Commission.

A. H. Rowan, Fort Worth drilling contractor, stressed the need of this consideration which has been presented four times to the War Manpower Commission and each time rejected. After an all-afternoon discussion, the WMC decided to send a representative to Texas to study the duties of a derrickman and see whether or not his training period and qualifications entitled him to be placed upon the list of critical occupations.

The representative indicated after the Texas survey that he favors placing derrickmen on the list of critical occupations and that he will do everything in his power to get such recommendation approved by the WMC.

Also, a representative from Selective Service Headquarters, indicated that he would urge as much leniency as possible toward derrickmen in particular and other members of the drilling industry, at a meeting of all the State Selective Service officials to be held in Washington shortly.

PAW Request for Added Funds and More Personnel Rejected by Committee

Rejecting a request for an increase of $480,000 and cutting $70,000 from the amount provided for the current year, the House appropriations committee recommended on May 25 that PAW be given $6,000,000 for operations during the fiscal year which begins July 1, next.

In reporting the appropriation, the committee paid tribute to the cooperative effort of PAW and the oil industry which, it said, "has resulted in a most gratifying situation with respect to the important supply of petroleum for the prosecution of the war," and explained that the cuts in funds were made with the cooperation of PAW officials, who have developed economies resulting in savings approximating $390,000 a year.

The committee refused to permit an increase in the staff from 1415 to 1479, as requested by the administration, and fixed the number of employes for the coming year at 1365. It also reduced from $600,000 to $425,000 the amount available for the payment of personnel employed without regard to the civil service act, consisting of key men drawn from experienced personnel in the oil industry.

Appearing before the appropriations subcommittee, Deputy Administrator Davies explained that PAW was asking an increase of $480,000 over the $6,070,000 provided for the current fiscal year in order to increase the staff and make earned promotions. He said in recent months PAW has lost men faster than it could employ them and while, over the past year, it has had an average of 1415 employees it now has only about 1372. The budget estimate called for 1479 persons.

Davies emphasized that a large part of the agency's work "is not done by our organization here but by the oil industry committees we have organized."

"These people," he said, "are giving their time without compensation, and I should like to add that they have contributed in an important way to the success of our petroleum operation. Were we asking for a budget to enable a government organization to do this whole job, it would be not $6,550,000 but many times more than that."

Davies disclosed that it is not now expected that the industry will come within 2000 of the 24,000 wells which were scheduled to be drilled this year, largely on account of the shortage of manpower. Of the total, he said, it had been hoped that as many as 5000 might

be wildcat wells, but current indications are that the number will not exceed 3500 or 4000.

One of the principal purposes of PAW's support of a general increase in the price of crude was to provide further incentive for wildcatting, he added.

The No. 1 oil problem today, Davies said, is manpower to do the war job. The next most important problem is that of materials and, he said, "the steel shortage is not as bad as it was, and certain other materials are in better supply, but the fact still remains that we do not have unlimited materials for use in operation."

"So long as this is the case, we have to plan and regulate its use and spend the materials in ways that will get the maximum returns in terms of petroleum products," he explained.

"Since wells in this country are producing at a maximum rate, and since the military demand continues to increase, we are faced with the problem of getting more crude oil despite the difficulty attendant upon finding additional oil domestically. We must turn to foreign sources. This effort represents one of the principal problems of our agency at this time."

At the same time, he pointed out, there are not sufficient materials to build refineries and drill wells abroad and at home, too, and there also has been, in the foreign field, a problem in transportation. The oil industry is anxious to expand and develop abroad and has made applications for materials for that purpose, some of which it has not been able to grant.

Caribbean Production Up

However, Davies said, the foreign production division has been able to develop a comprehensive program for the Caribbean area, which is now producing about 700,000 barrels a day, most of which moves to Europe or Africa, and is to be pushed up to 1,000,000 barrels daily by next year.

At the present time, about 150,000 barrels of oil daily is being imported into this country, almost entirely from the Caribbean area.

Discussing possibilities of further production in this hemisphere, Davies explained that little faith is placed in Mexico, where the only field now of any great importance is Posa Rica. Other fields have declined in production and in any case are not in first-class operating condition.

Completion of the 24- and 20-inch pipe lines, it was testified by Assistant Deputy Administrator J. Howard Marshall, has cut the transportation payments by Defense Supplies Corporation from $200,000,000 a year to $100,000,000 a year, and shortly the situation is expected to be in balance insofar as the eastern movement is concerned.

Possibilities that vast and now unknown reserves might be found at stupendous depths were suggested by committee members, but Don R. Knowlton, director of production, warned against placing too much hope in any such theory, explaining that while it is mechanically possible to go much deeper than the 15,400 feet at which the deepest well is now, "the tendency is that the deeper we go the more gaseous are the reserves and that comparatively few fields have been found below 10,000 feet.

"Nature, apparently, has put a bottom, so to speak, on our finding large reserves of oil at great depth, because the petroleum found at increasing depths seems to be more and more gaseous or distillates rather than oil reserves. There are some oil fields at such great depths, but most of the deep reserves are predominantly gas or distillates."

PAW's presentation of its operations drew a commendation from Subcommittee Chairman Clarence Cannon of Missouri, who told Davies "Personally, I am impressed with the efficiency with which this problem is being handled in all three of its phases, the production, processing and marketing and distribution. I think you have done a wonderful job in handling this complicated problem."

Standard of California Prepared to Accept Navy-Dictated Elk Hills Pact

Whether the proposed Navy-Standard Oil Company of California agreement for wartime development of Elk Hills production was a shot-gun wedding was the subject of acrimonious debate before the House Naval Affairs Committee last week on proposals by Chairman Carl Vinson of Georgia for legislation setting up standards in making a contract.

The impression that Standard Oil Company of California was being forced into a contract was voiced by Representative W. Sterling Cole of New York after F. S. Bryant, vice president of the company, indicated it was prepared to accept a Navy-dictated agreement although it was felt insufficient assurance had been given that the company would not at a moment's notice be forced to discontinue production.

Bryant urged legislation assuring the company withdrawal of 15,000 barrels daily so long as the Navy was producing, so the company would not be left with heavy expenditures against which it could get no oil.

Vinson denied he had ever sought to bring pressure to bear on the company, and Bryant confirmed his statement that the two had never discussed the contract until the preceding day, when Assistant Secretary of the Navy Bard and others were present.

Denying that the company had been "high-jacked", Bryant explained that "our present negotiations with the Navy surely cannot be otherwise than difficult."

"The Navy Department, under criticism of the first contract, was obliged to try to avoid any possibility of censure in any further contract that they might make. Likewise, we were under the same handicap," he said.

Bryant admitted that the contract is "rather stringent", but explained that "it is not necessarily a question of any one individual or any agency (exerting pressure). It is a confusion in the public mind arising out of, in my opinion, ungrounded and unfounded statements which have been made in the past."

Asked by Representative L. Mendel Rivers of South Carolina how much "in dollars and cents" the company would lose as a result of the contract, Bryant said it could not be estimated off-hand but would depend on how the contract was interpreted in the future as well as the future price of oil.

"If we get out our fair share of the reserve we will not have been injured except by reason of the delayed production," he said. "It is not definite we will lose anything by this contract."

"Is this a workable manner to permit a contract to be entered into between you and the Navy Department," Vinson demanded.

"I can't say it is unfair," Bryant responded.

Bryant's testimony followed appearance before the committee of Charles S. Jones, president of Richfield Oil Company, who charged the legislation would give the Navy ex parte right to condemn his company's lands adjoining the reserve, on the grounds of threat of drainage. Jones charged the Navy with plotting to get the company's holdings in the North Coles Levee field, explaining that the proposed expansion of Reserve No. 1 would take in a small part of that field and provide a springboard for further acquisitions.

At an executive meeting May 24, the committee voted to make a favorable report on the legislation drafted by Chairman Vinson, setting forth the principles to be applied by the Navy in its contract for war-time operation of Naval Reserve No. 1. (THE OIL WEEKLY, May 22).

Because of the urgent need for additional oil on the West Coast for military purposes, it is planned to speed enactment of the measure before Congress recesses next month.

As reported, the Vinson substitute for the bill originally introduced provides the protection against a sudden shut-down of its minimum production of 15,000 barrels daily sought by Standard Oil Company of California.

With the need for speedy disposition of the legislation in mind. The Senate naval affairs committee opened hearings on the bill May 25, receiving from Chairman Vinson an account of the objections to the Navy-proposed measure which led to the development of the recommendations which were sent to the House floor.

Assistant Secretary of the Navy Ralph Bard was the first witness before the committee, going over the history of the proposed contract and submitting the department's views on the newest version of the bill, which he said was acceptable.

The legislation is scheduled to be taken up by the House early this week.

Big-Inch Schedule Calls For 315,000 Barrels Daily

Operation of the big-inch pipe line at a rate of 315,000 barrels daily during the three months beginning June 1 is contemplated in schedules issued last week by PAW.

The schedules call for the sale to War Emergency Pipelines Inc., at Longview, of 124,000 barrels daily of East Texas oil, 67,600 barrels of Southwest Texas oil and 123,400 barrels of West Texas oil.

Knowlton and Miller Resignations Cause PAW to Wonder About Staff

Donald R. Knowlton, since February, 1942, director of production, has resigned from PAW to become manager of the foreign division of Phillips Petroleum Company, for which, prior to joining PAW, he was manager of production.

Announcing the resignation May 22, Deputy Administrator Davies said "I regret very much having to accept Mr. Knowlton's resignation. His work during the 28 months he has served as director of production has been extremely valuable to PAW. While he has remained with PAW for more than the agreed upon period, his services here will be greatly missed."

Max Miller, director of construction since August, 1943, also will return to his company in New York June 1, to be succeeded by George Gibson, now assistant director. Other resignations of top men are impending.

There is apprehension in PAW that serious handicaps may arise if the pressure of oil companies for return of men now serving the government on leaves of absence is not lightened.

This matter may be a major subject of discussion at the June meeting of PIWC which, some months ago, discussed the same problems with Administrator Ickes and Deputy Administrator Davies appealing to the companies to permit their men to serve to the end of the emergency.

Then, it was pointed out that, staffed almost exclusively with industry men, PAW will be able to close up within a short period after the end of the war, but it was warned that if the agency had to recruit a staff in the same way as do other government offices, it might develop that men without industry experience would not only undertake things which more oil-minded officials would not consider but, even more dangerous, might seek to perpetuate PAW.

DONALD R. KNOWLTON

Among men who have left PAW in recent months to return to their own businesses are several who steered the organization through the dark days of the East Coast crisis and who have been largely responsible for effecting policies which have gained for PAW recognition as the most successful example of government-industry cooperation in this war.

Top-Flight British Officials Due Soon to Resume Oil Conversions

Barring the actual launching of the invasion of Europe, top-flight British officials are expected to reach Washington within the next two weeks or so for the second step in the negotiation of an understanding with the United States government on postwar oil problems, the meeting with the President's committee headed by Secretary Cordell Hull.

At the State Department, Charles B. Rayner, consultant on petroleum, said that the report of the American group which participated in last month's initial conferences, had already been submitted. That report, it is understood, was not lengthy, consisting mainly on an exposition of the principles developed in the meetings and set forth in the joint memorandum signed by both groups, with pertinent comment.

When they left Washington, members of the British delegation thought that the next step in the negotiations should not be long delayed, and it was anticipated that higher officials, who can talk on a level with the members of the President's committee, would come to the United States without delay.

However, no uncertainty is felt in department circles over the possibility of a brief halt in the negotiations, it being realized that as "D-Day" approaches and the tempo of military operations speeds up, both men and travel accommodations are limited.

The forthcoming conference is not expected to require any great amount of time. So far as could be learned, there are no controversial matters on the agenda, and much of the discussion is expected to be devoted to ways and means of effectuating the principles which are to be adopted.

The indicated abandonment of government construction of the Saudi Arabian pipe line in favor of its building by the companies, with or without a government loan, is understood to have eliminated one possibly knotty problem, since such action would put the companies under State Department protection and pave the way for their support by diplomatic, rather than possible military means.

Probably to be taken into consideration, however, in a discussion of the postwar oil situation, is the peacetime use to be made of installations and facilities in various parts of the world which have been made to meet military needs. Such installations, it was pointed out, will be accomplished facts and not blue-prints, and they must either be put to peacetime use or torn down after the war.

Senate Group Increases Alaskan Exploration Fund

Increasing the fund for mineral investigations in Alaska by the Geological Survey from the $177,000 granted by the House of Representatives to $1,252,000, the Senate Finance Committee last week sought to get started the Interior Department's program for study of Alaskan oil resources, approved by President Roosevelt in 1942 but thereafter "lost."

The department plans to make tests in the Yakataga, Katalla, Iniskin, Alaska Peninsula and Northern Alaska areas, rounding out an exploration program in which the Navy will make tests on the Naval Petroleum Reserve and the Army will operate in the wide bay area. All of the areas selected by the department are within 20 or 25 miles of the coast.

The Senate committee restored $14,000 cut by the House from the fund for operation of the Petroleum Conservation Division, restoring the $214,000 originally sought and provided the first $8,000,000 for the $30,000,000 investigation of the production of synthetic liquid fuels from coal, oil shales and other substances, recently authorized by Congress.

The Bureau of Mines also was given an additional $80,000 to determine how the quality of base stocks for aviation gasoline can be improved and to find means of treating high-sulphur crude and distillates so that they can be used effectively in the manufacture of gasoline, together with $500,000 for work on the stimulation of production by secondary-recovery methods.

Standard Asked for Farbenindustrie Stock.

The Alien Property Custodian on May 24 issued an order on Standard Oil Company (New Jersey) demanding the surrender of 20 percent of the outstanding stock of Standard Catalytic Company, 50 percent of the stock of Jasco, Inc., and 25 percent of the stock of the Hydrocarbon Synthesis Corporation formerly owned by I. D. Farbenindustrie.

The order also covered approximately 675 patents and 100 applications for patents held by the three corporations, which were organized to operate in this country certain patent-pooling arrangements sponsored jointly by Standard Oil Company (New Jersey) and I. G. Farben.

Alien Property Custodian James E. Markham explained that the interest of I. G. Farben in both the patents and the company stocks was vested in APC by Vesting Order No. 1 on March 25, 1942. The pooling arrangements were declared illegal in the consent decree entered on the same date in the gov-

ernment's antitrust suit against Standard Oil Company (New Jersey) in which the rights of APC were reserved in the stock and patents originally placed in the pool by the German chemical trust.

Ownership of the stock and patents has been the subject of a series of conferences between the custodian and Standard Oil Company (New Jersey) officials, who claimed that the company was the owner, but the custodian has ruled that his vesting of the interest of I. G. Farben took full and complete title because it owned them at the time of the vesting.

"The property now required to be turned over to this office by the Standard Oil Company will be held and administered by this office for the interest and benefit of the United States," Markham said. "The patents will be available for licensing to American industry in accordance with our usual policy in such matters."

Involved are a number of important processes for the refining and treatment of crude oil, the making of synthetic gasoline and lubricating oil from coal, peat, natural gas and other materials, and making of special chemical products, including synthetic rubber.

It was explained that the antitrust decree set up a comprehensive system for compulsory licensing of these patents under the supervision of the Department of Justice, irrespective of the ultimate solution of the disputed claims of ownership, and special agreements for the use of the patents in the production of synthetic rubber and in catalytic refining are in force as a result of an understanding between APC and Standard Oil Company (New Jersey) that the disputed ownership should not in any way affect the widest possible use of the processes covered by the patents in the war-production program.

Pipe-Line Hearings Soon For El Paso Gas Company

The Federal Power Commission has scheduled hearings at Fort Worth, Texas, next month on applications filed by the El Paso Natural Gas Company, as follows:

June 12: Hearing on application to operate certain additional facilities in connection with loop lines in New Mexico and Arizona, including 44.61 miles of 12¾-inch pipe line from the Eunice compressing station in Lea County, New Mexico, to connect with the company's 8⅝-inch line.

June 13: Hearing on application for construction of 31.5 miles of 16-inch pipe line from the Eunice compressing station to Jal plant No. 1 in Lea County; five 800-horsepower gas compressor units at the Eunice station; two 24-inch gas scrubbing towers at the Eunice station and two similar towers at Jal plant No. 1.

The commission also announced receipt of applications from the Empire Gas and Fuel Company to acquire from Empire Producing Corporation and operate 8.1 miles of eight-inch pipe line in New York and Pennsylvania, and from the Southern Union Gas Company, Dallas, for issuance to it, as successor to New Mexico Eastern Gas Company, a certificate of public convenience and necessity under the "grandfather clause" of the natural gas act.

Suggests Old-Age Pension For High-Cost Strippers

An old-age pension for high-cost stripper wells is suggested by N. W. Shiarella, president of the Kentucky Oil & Gas Association in a recent letter sent to members. In the same letter, Shiarella discussed the proposed oil subsidy, told of the continued fight to obtain higher ceilings, and expressed the belief that Congress may yet provide better prices.

"I want to pass on to you for consideration a conservation policy to save the four to six billion barrels of crude oil underlying the nation's stripper wells," wrote Shiarella. "Almost two years ago this association suggested to the National Stripper Well Association the idea of an old-age pension for these high-cost wells. Our thought was and still is to have the industry work out a plan that would provide a permanent differential in the price paid for oil from stripper wells so that in depressed times such as the present, these wells would not be prematurely abandoned . . . If these large reserves are worth saving, then both PIWC and PAW who have men qualified to work out a workable plan should do so rather than have some other governmental agency do the job for them. I am fully aware of the fact an economist will tell you that it will not be practical, but ask the same man if he knows of any other means of saving these reserves. The National Stripper Well Association is trying to formulate a plan."

Shiarella told association members of the continued effort by the Independent Petroleum Association of America and other groups to obtain an overall increase in crude oil and product prices via congressional action, adding "but so far the boys around the White House have been able to brush off our efforts. We are still trying to have the OPA bill amended to more equitably provide for an adequate price for crude oil. I believe that when the bill comes out on the floor, that we have an excellent chance to get it amended."

It looks, continued Shiarella, as though "you soon will receive a subsidy for your stripper-well production. I know that with exception of a very few in the state you are opposed to subsidies," but when the offer comes through there is little that can be done but to accept it.

"Those in the industry who encouraged the White House boys in their effort to subsidize us will probably live to see the day that they will wish we had been successful in our effort to carry on our business as Americans and not as the bureaucrats would like to have us do," he concluded.

Crude Oil Production in the United States

(Estimates compiled by The OIL WEEKLY. All figures indicate daily averages, in barrels.)

STATE OR DISTRICT	PRODUCTION IN WEEK ENDED May 27	May 20
Alabama	100	100
Arkansas	80,450	79,700
California	838,100	834,000
Colorado	8,200	8,000
Florida	35	30
Illinois	211,100	214,300
Indiana	12,350	14,000
Kansas	283,700	284,200
Kentucky	21,650	22,600
Louisiana	356,850	358,400
North Louisiana	73,850	75,150
South Louisiana	283,000	283,250
Michigan	46,350	52,550
Mississippi	41,500	42,000
Missouri	100	100
Montana	21,960	22,580
Nebraska	1,000	1,050
New Mexico	112,100	112,200
New York	13,750	14,300
Ohio	7,050	8,150
Oklahoma	333,700	333,900
Pennsylvania	41,450	41,400
Tennessee	35	30
Texas	1,995,650	1,995,550
Upper Gulf Coast	519,800	519,900
East Texas Field	364,050	364,000
Rest of Eastern Texas	137,200	137,000
Lower Gulf Coast	210,950	210,900
Southwest Texas	76,400	76,550
South Central Texas	19,850	19,800
West Texas	429,100	429,050
North Texas	147,100	147,250
Panhandle	91,200	91,100
West Virginia	8,600	8,700
Wyoming	81,150	92,000
Total United States	4,516,930	4,539,840

Disposition of Surplus War Properties Discussed

Legislation under which the disposition of all lands and improvements thereon acquired by the government for war purposes would be handled by the Interior Department was laid before Chairman James F. Murray of the Senate war contracts committee May 25 by Secretary Ickes.

The department bill would cover all lands, including public lands which are sites of industrial plants or similar structures, which are declared surplus by the agencies holding them and are not needed by any other federal agency.

The Secretary of the Interior would have the authority to retain in government ownership any properties which he decides should not be disposed of; in disposing properties, former owners are to be given preference in sales or leases, with second preference going to public agencies and cooperatives.

Contractors May Get Permit to Pay Car Expense

As the result of requests from drilling contractors for a "car expense" allowance in isolated areas the War Labor Board for Region (Dallas) has ruled that drilling contractors may pay "car expense" to one member of each crew where that member transports the other crew members to and from location. Such car expense must not exceed 7 cents per mile and may be based either on the total mileage driven or on all round-trip mileage above a certain maximum agreed upon. Contractors who have isolated drilling locations and who wish to pay car expense on the above basis, may apply for permission to do so on the regular WLB Form 10.

Eastern States Report Oil Exploration Interest

A leasing campaign is reported under way in New Jersey with the Sun Oil Company and Sinclair Prairie Oil Company taking considerable blocks of acreage. A rental of 10 cents an acre with one-eighth royalty is reported being provided in the five-year commission leases now being taken.

Geophysical crews are reported active in Maryland with the Pure Oil Company and Sun Oil Company showing much interest there. Pure Oil Company is drilling in Wicomoco County on the eastern shore peninsula.

New Production Methods Described To API at District Meeting

Reservoir performances, secondary recovery, salt water disposal, continuous boring, water exclusion discussed along with wartime restrictions and postwar tasks; J. S. Montgomery named chairman

By ANTHONY GIBBON, Staff Writer

AVAILABILITY of drilling and production materials, shortage of skilled manpower, employe training, industry relations with both the government and the public, postwar conditions, and new developments in salt water disposal, continuous coring, water exclusion, secondary recovery and reservoir performance were among the subjects discussed by speakers at the spring meeting of the Mid-Continent District of the American Petroleum Institute's Division of Production, held in Tulsa May 25-26.

J. S. Montgomery, Phillips Petroleum Company, Oklahoma City, was elected chairman of the district. Montgomery succeeds H. W. Ladd, Stanolind Oil & Gas Company, Tulsa.

L. N. Burket, The Carter Oil Company, Great Bend, was elected vice chairman for Kansas; J. R. Evans, Stanolind Oil & Gas Company, Tulsa, vice chairman for Oklahoma; and D. J. Gribbon, The Texas Company, Pampa, vice chairman for The Texas Panhandle.

Wesley Moore, British American Oil Producing Company, Oklahoma City, was elected secretary-treasurer.

Abstracts of papers follow:

Production Materials Under War Conditions

By DOUGLAS O. JOHNSON
Gulf Oil Corporation

Trucks and truck parts are considered the most critical materials in the oil industry with engines and engine parts also being difficult to obtain. Transportation equipment is becoming old and worn out and with oil industry requirements now on the high urgency list ODT is attempting to have a small percentage of parts allocated for industry, particularly oil field use. Carburetors and magnetos are particularly critical and because of slow deliveries of oil and butane equipment some operators have resorted to gasoline engines for prime power. Parts are being set aside by manufacturers to care for emergency needs of the industry.

The sucker-rod situation has been greatly eased with the release of prewar alloy steels and steel is forthcoming for tubular goods and pumping units and tanks. Tank companies eliminated welding and adopted bolted tanks so that lighter steel would be used. Redwood for tank construction is still difficult to obtain and available wood has not given satisfaction.

Since comparatively little rubber is used by the industry shortages have not been felt and where natural rubber was unobtainable producers resorted to synthetics which have given good service. Substitute belting material is being used satisfactorily.

Large stocks of equipment on hand, systematic planning and cooperation, ingenuity of operators, manufacturers and suppliers, and an effective conservation program are factors which have kept the oil industry at wartime production tempo.

Training New Employes Under War Conditions

By M. L. POWERS
State Supervisor, Trade and Industrial Education
Oklahoma A. & M. College

A 30-hour training program which enables supervisors to become acquainted with their managerial functions, keep crews working as a unit, plan and organize work, break in new workers, maintain harmony within the ranks, and find safer, quicker, easier and better methods of doing the job, is paying industrial dividends. As the war effort increases, industry is being called upon to provide more production with fewer men. As manpower shortage becomes acute approximately 80 percent of each supervisor's time is spent training workers on the job. Therefore, the supervisor's responsibility for training workers has become his first and greatest responsibility. The training-within-industry program which provides for the 30-hour training schedule stresses instruction, supervision, management, job instructor training, job relations training and job methods training. The schedule provides a basis for further training programs which management can set up. A good supervisor cannot be completely trained in 30 hours and supervisory training should continue to include such subjects as placing workers, giving orders, building morale, maintaining interest, cooperation, organization and planning, safety and other job requisites. Supervisory training is not new to the oil industry. A supervisory training program, set up several years ago by several state departments of trade and industrial education in cooperation with a committee of API, was well planned and developed to meet the needs of foremen and supervisors at that time, and while fundamental problems have not changed, some of the problems, due to wartime conditions, have increased in importance.

Drilling Materials Under War Conditions

Report by Mid-Continent District
Committee on Drilling Practice
W. H. MORRISON, Chairman

Probably the most serious handicap for the drilling contractor and operator is an inadequate supply of repair parts. While the parts situation is somewhat improved, there are numerous instances where a rig has been shut down for as long as three weeks for a comparatively minor part. If the present upswing in drilling activity is continued, the industry must receive (1) improved quality of materials, (2) adequate stocks of parts, (3) improved service facilities, and (4) relief from skilled manpower shortage. Constantly increasing depth in drilling is taxing the strength of many rig parts. If this continues, the best possible alloys with the highest strength and best wearing qualities are necessary to minimize drilling time. An adequate supply of parts, including bits, tool joints, bearings, engine parts, etc., will get more hole drilled per pound of material expended than any other single item. Distributors' stocks must be adequately maintained to assure equitable distribution of parts, thus preventing hoarding and minimizing downtime for repairs. Skilled labor and more repair materials must be made available to field repair shops in order to insure better work, longer runs between repair jobs and more footage drilled. Additional trucks, tractors and earth-moving equipment with necessary repair parts and competent operators are necessary to decrease moving time, which is now about 300 percent above normal. Shortage of housing facilities for drilling crews is becoming an important factor contributing to manpower shortage and some suggest moving idle trailer camps from completed defense projects. With the high percentage of wildcat drilling now under way, trailer camps might work out satisfactorily.

The Application of Job Design to Petroleum Production Operations

By H. G. THUESEN
Department of Industrial Engineering
Oklahoma A. & M. College

Job design, first applied to petroleum production in 1939, consists of breaking work of the job into definable and measureable elements, analyzing these elements for effectiveness in doing work and then reconstructing the job, using only effective elements in proper sequence so that the job can be performed in the shortest time with the least effort. Through job design methods are improved by: eliminating unnecessary elements of work; substituting effective for ineffective elements of work, and elimination of periods of enforced idleness. The first step in job design is to determine all objectives of the job. Next the job is studied to learn exactly how it is being performed, and accurate data must be taken, using stop watch and motion picture camera. Data must be analyzed and at this point the foreman and other supervisory personnel are called in for their contribution. Thus the job procedure finally perfected is based not only on accurate factual data but also embodies experience of those

in the best position to advise on practical matters and to put the improved methods into effect. Because job design deals with utilization of labor on the job, it must be integrated into the operating policies of the organization from top to bottom and its application requires the same managerial skill and day-to-day attention required by any fundamental operating technique. Carefully administered, job design may be expected to result in relatively large savings. Based on experience, labor savings ranging from 10 to 50 percent may be realized in activities employing the bulk of labor in petroleum production.

Progress Report on Pumping Experiment

By GLENN M. STEARNS
University of Oklahoma

Continuation of experimental study of the performance of sucker-rod pumps being conducted jointly by the Mid-Continent District Topical Committee on Production Practice and the University of Oklahoma describes equipment and methods used in measuring the effect of plunger and liner dimensions, plunger surface, differential pressure across plunger, and oil characteristics upon the rate of slippage past the plunger. Experimental results are used as a basis for calculation of slippage in any given pumping well where certain data are available. Tests made to date have been rather limited, but indicate that the volume of slippage is negligible in all practical instances with a plunger fit of .001 inch. Even with a plunger fit of .002 inch the amount of slippage would be relatively small in most wells where sucker-rod pumping is applied. With plunger fits of .003 inch or greater, the slippage becomes much more significant, perhaps excessive in amount. Testing over a wider range of plunger size and oil characteristics is recommended.

Postwar Delusions

By DON EMERY
Executive Vice President,
Phillips Petroleum Company

Men everywhere have been prompted to wonder whether anything may be salvaged from the present war. The difficulty however with the perspective of men is that under oppressive forces of war they are deluded into thinking that at the war's end all people in all nations will surely be willing to do what it takes to prevent another such catastrophe and that this accomplishment will occur by rather simple methods and in a relatively short time. They are also beset with the desire to return to normalcy and to isolation. Implicit in these two basic delusions is the current belief that in order to eradicate the causes of war it is necessary to substantially curb nationalism and in some miraculous way to outlaw imperialism and to rid the world of the tactics of power politics. Failing to remember that men have given their loyalties for hundreds of years to the nationalistic efforts of conquest, one is prone to conclude that the essential device for the prevention of wars is some international political order that will change overnight the habits and emotional responses of men in giving their loyalties to their mother countries. Any international order predicated upon such delusions is bound to fail. We must recognize that future international good will depends upon the disposition and predisposition of each of the powerful countries of the earth to be willing to submerge and adjust their private interests as they conflict with interests of other nations, and that any new international agency devotes its instrumentalities to eradicating the causes of war that lie hidden in the adjustments of international exchange, political devices to prevent unemployment, the exploitation of backward countries, making raw materials available to all nations, distribution of food supplies, control of patents, operation of international cartels, and the channels of commerce and trade. But before creating such an agency it is better that the victorious powers—the United States, Great Britain, Russia and China — first determine whether they can sufficiently and adequately solve their conflicts of interests that may arise in an effort to give political and economic stability to the conquered countries. If this postwar effort may be made without breeding ill-will among the victorious powers, it will then be propitious to set up an international agency which, speaking for such powers and others who desire to join, will say to all nations "you may but you are not compelled to join us. If you have disputes in respect to international problems you may attempt to settle such disputes yourselves. You may but you are not compelled to submit them to the international agency. If you do submit them to such agency you are not compelled to abide by its decision but after having taken one or all of these steps you may not then resort to the field of battle to settle your differences." Finally each nation must say to itself that no nation can contribute anything of value to the eradication of the causes of war, as they lie deeply rooted in the relation between war and unemployment, unless the people of that nation are willing to acknowledge that the survival of a stable government at home depends on certain presuppositions about the capacities and virtues of men and the existence of certain material and intellectual conditions conducive to the exercise of such capacities and virtues. And this nation must not forget that its biggest stake in this war is the returning soldier who when he returns must be provided with an opportunity to acquire by his own effort in an occupation for which he is fitted that measure of economic security essential to a decent and independent living.

Secondary Recovery in the War Program

By CHARLES B. McCLINTOCK
PAW, Washington, D. C.

Too little attention is being given to secondary recovery, one of our most valuable tools for discovering additional crude oil reserves. Think in terms of old oil reserves rather than new oil reserves. Two methods of secondary recovery now being practiced, water flooding and gas or air injection, are bringing about a reappraisal of the oil reserves of the nation. Secondary recovery methods need not wait the time that properties are no longer economic by primary methods of production. No longer should we feel that a pool passes from a stage during which the application of pressure maintenance, by the injection of gas or water, would have been advisable into a stage of settled production ultimately to arrive at the stripper stage when, everything else failing to maintain an economic operation, we initiate secondary recovery. Introduction of energy from without should be initiated as soon as it is determined that energy within the reservoir is insufficient to obtain maximum production. While it is true that in many cases phenomenal results have been obtained by use of elaborate water treatment plants, etc., it is also true that good results have often been obtained by use of "poor boy" methods. While this does not mean throwing caution to the winds, some venturesome, or wildcatting spirit should be injected into secondary-recovery thinking. There are more than two million productive acres to be prospected; possibly what is needed is a secondary-recovery "wildcatting" program.

Reservoir Performance

By J. J. MULLANE
The Carter Oil Company

Three definite modes of performance of petroleum reservoirs have been recognized — dissolved-gas drive, gas-cap drive, and water drive. These are defined according to the source of energy, or drive, under which the oil is moved through the producing formation into the well. Outstanding features that characterize each of these types of operation must be known, because, in a great many instances, a choice between them is possible early in the development of a field. Field conditions which make dissolved-gas drive mandatory are: (a) Flat structure, usually with substantial stratification or low vertical permeability, obviating the possibility of appreciable gravitational segregation of gas released from solution. (b) Absence of a free-gas cap or of a water body which could move into the oil reservoir. (c) High rate of production, substantially exceeding the ability of any water present to advance into the reservoirs, or the ability of a free-gas cap, if present, to expand efficiently. Under the gas-cap drive, the energy in the system in the form of solution gas is augumented by that of the expanding gas cap and, under proper conditions, will be further enhanced by force of gravity. In this type of drive, pressure may be either maintained at approximately its original value or maintained under a controlled decline. At the same time, the producing rates are maintained at more uniform levels than possible under ordinary dissolved-gas drive operation.

The chief operating characteristics of water-drive recovery are the maintenance of reservoir pressure at relatively high levels throughout the course of production, the retention of productivity by the wells, and operation at low gas-oil ratios. Requirements for a satisfactory water drive are: (a) The oil body must be in good communication with a permeable and continuous water-bearing sand (usually the regional continuation of the oil sand itself) of considerable areal extent, or outcropping at a reasonable distance. (b) Permeability of the sand must be fairly high, so that the rate of water advance can be of some benefit within practical time limitations. Similarly, oil viscosity must be reasonably low. (c) Sands in the oil reservoir proper must be reasonably continuous and uniform, so that effective flushing may be obtained. (d) Rate of fluid withdrawals must be restricted to a level commensurate with the ability of the water to advance evenly into the oil sands, if maximum effectiveness of the flushing action, through avoidance

■ CONTINUED ON PAGE 60

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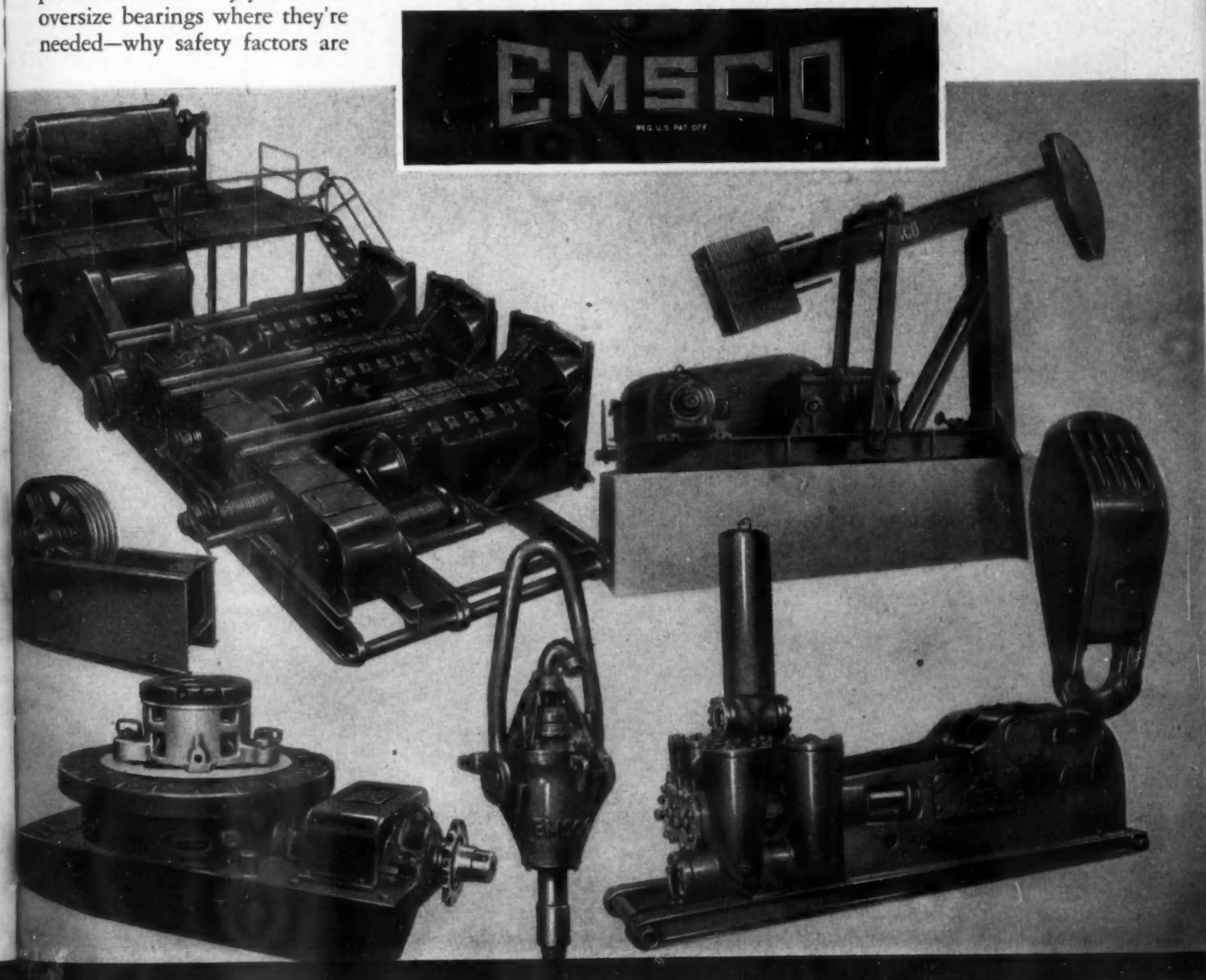


World's Deepest Casing String Set At 15,278 Feet

Record length of pipe landed and cemented with standard equipment without difficulty

By ELTON STERRETT, Staff Writer

THE deepest well in the world is now cased with 15,278 feet of 5½-inch O. D. casing.

The longest string of casing ever landed has been run in Phillips Petroleum Company's Ada Price 1, West Texas wildcat in Pecos County, drilled 204 feet into the deep Ellenburger to bottom at 15,279 feet. This string of pipe, just short of three miles in length, weighs 155.92 tons, and is the heaviest casing load ever carried on a 10-line string-up. The string, to meet collapsing pressures under bottom hole conditions and also to withstand the tremendous tensile stress of placing, was of the double-taper type, being made up of the following weights of pipe:

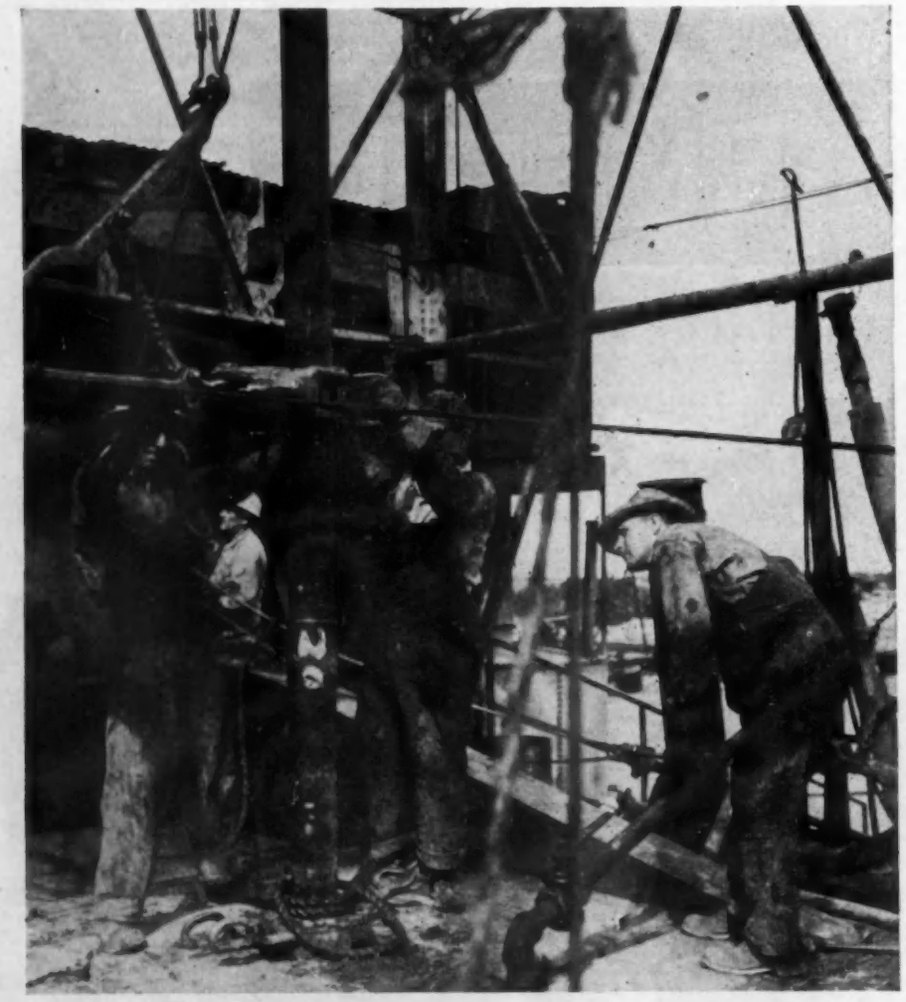
Depth (Feet)	Wt./Ft. Lbs.	Footage Run	Total Wt. of Section	Type of Joint
0– 4,024	23	4024	92,552	6-thd. Acme
4,024– 5,786	20	1762	35,240	Long Collar
5,786–10,079	17	4293	72,981	Long Collar
10,079–12,916	20	2837	56,740	Long Collar
12,916–15,278	23	2362	54,326	Long Collar

The string carried a standard cement whirler type guide shoe on bottom, with float shoes between the first and second and again between second and third joints of the 23-pound bottom section. The first 5200 feet of pipe run was handled with a light elevator and the usual rotary-table type slips. With completion of the running of the lower 20-pound section a heavier elevator was put on, and carefully adjusted to suspend the joints of pipe exactly perpendicular for quick and accurate stabbing.

At about the same time was made the change-over on the floor from the three-slip rotary-table support to an automatic casing spider, in which four slips, spring floated against the pipe, are automatically moved into gripping position. The manual release on this unit was controlled through a short pipe handle so that the slips could be retracted sufficiently to permit passage of the collar, after which the joint could be lowered until minimum clearance was obtained between elevator and top of the spider.

Apart from the switch of elevator and spider, the only change in equipment during the 18-hour running of the string was the use of a new endless spinning rope about half way through the job. The drawworks, engines and other equipment were used exactly as they had been during the final drilling operations on the well, and functioned without hitch during the long run. While running the pipe, the smaller or standby pump was used to provide fluid for filling the pipe, and to keep the mud jetted and in proper condition.

From the tailing in of the first joint to the final setting of the spider on the



When this photograph was taken 2362 feet of 23-pound casing already had been run, and the second of the 20-pound joints was being tonged to its mate in the grip of the rotary table slips. The pusher of the casing crew stood by the filling line, ready to drop it into place over the open casing the instant the string was lowered and the elevators begun their upward cycle.

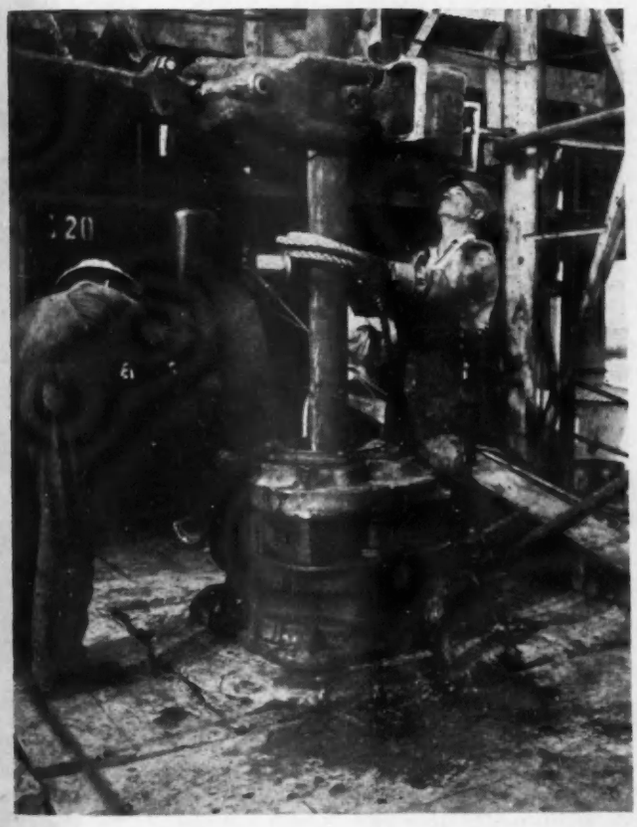
Procedure for tailing the pipe into the derrick found one joint awaiting the pickup by the noose attached to the elevators, while the succeeding joint was rolled onto the runway and the tailing rope attached, ready for the cathead man to yank it up the ramp as soon as clearance permitted.

completed string, approximately 18 hours were required. Only interruptions to the steady additions of pipe to the casing in the hole were when it was necessary to suspend operations while the fill-up line caught up with the pipe again, it being impossible to fill the pipe as run in the brief interval available between setting the spider on the lowered string and stabbing of the next joint.

With the string landed, mud was put through the circulation head and flow started down through the string and back up the annulus to condition the hole. Cementing, with 1000 sacks of high-temperature sulphate resisting cement, was completed in only 28 minutes, three cementing truck delivery lines being manifolded together on the derrick floor.

The main mud pump was then put on, and operated for 58 minutes at closely checked speed and pressure, at which time the cement was displaced into the annulus and the deepest cementing job added to the records of deepest drilling and deepest casing running jobs.

The entire operation of casing and cementing was 90 percent preparation and 10 percent actual running. Not only were all units laid out for most efficient operation, but every move was checked in advance and steps taken to insure proper sequence. In the running of the pipe, for instance, each joint had marked on it in large figures the weight, and the joints were numbered serially so that no running tally was required to give immediate information of string already run. To minimize possible dirt



Casing running through the automatic spider as the pipe was lowered free of the slips. One hand on the lever held the slips free while the spider, held in place on the rotary table merely by its own weight, was free to shift under the sway of the string. The other crewman held the coils of the spinning line to clear them past the approaching collar.

The automatic spider supported the load of the string already run while the elevator was released preparatory to its next run upward. An interesting sidelight on the careful attention to detail is shown by the loop of the tail-in line held by the man at the ramp head; this act kept slack of the line away from the elevators and possible interference with the work of the men at the pipe. The temporary scaffold built around the spider was to bring operations at a level requiring a minimum of human exertion.

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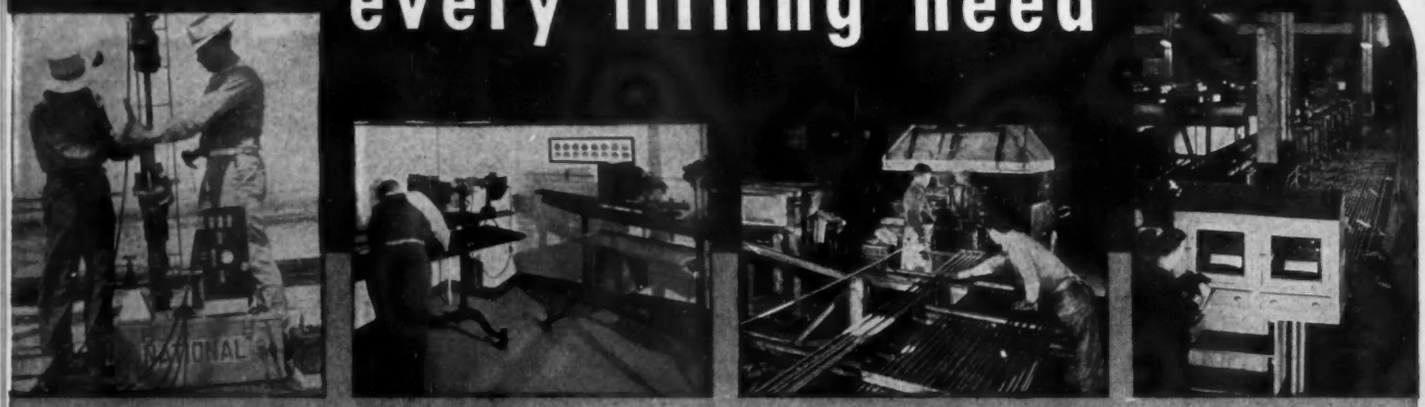

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Originally designed through actual, on-the-spot investigations of service conditions in all kinds of oil fields... carefully watched in manufacture, from the casting of the ingots to final shipment of the finished product . . . National Sucker Rods give you the fullest possible measure of long, trouble-free lifting performance. There is a grade that exactly fits your needs.

on the casing threads, the thread protectors were removed and both male and female threads cleaned with wire brush and solvent just ahead of the actual tailing of the pipe into the der-

The range of specifications covers conditions found in practically all wells.

GRADE 30. For light and medium pumping loads where fluids are non-corrosive. It may be used with fair success in the presence of small quantities of hydrogen sulphide.

GRADE 40. For heavy pumping loads where fluids are non-corrosive and there are no appreciable quantities of sulphides.

GRADE 50. Will handle very heavy pumping loads where the fluids are non-corrosive and free from sulphides.

GRADE 71. For heavy loads where corrosion is moderate and sulphides not severe.

GRADE 81. For heavy pumping loads where corrosion is bad but sulphides not severe.

GRADE 91. For heavy pumping loads under severe corrosive and sulphide conditions.

BOX AND PIN TYPE

Diameter of Rod	5/8"	3/4"	7/8"
Length	24' 6"	24' 8"	25'
Size Box and Pin Thread	15/16"	1 1/16"	1 3/16"
O.D. of Shoulder and Box	1 5/8"	1 1/2"	1 11/16"
Size Wrench Square	7/8"	1"	1"
For Tubing Size	2"	2 1/2", 3"	3"
Weight per 1000 Feet, lbs.	1128	1586	2167

DOUBLE PIN TYPE

Diameter of Rod	5/8"	3/4"	7/8"	*1"
Length, including Coupling	25'	25'	25'	25'
Size Rod and Coupling Threads	1 3/16"	1 1/16"	1 3/16"	1 3/8"
O.D. of Coupling	1 1/2"	1 5/8"	1 13/16"	2 1/16", 2"*
Length of Coupling	4"	4"	4"	4"
Size Wrench Square on Rod	7/8"	1"	1"	1 5/16"
Size Wrench Square on Coupling	1 3/8"	1 1/2"	1 5/8"	1 7/8"
For Tubing Size	2"	2 1/2", 3"	3"	3", 2 1/2"*
Weight per 1000 Feet, with Couplings, lbs.	1165	1668	2236	2988

*Couplings with 2" O.D. are for use in 2 1/2" Tubing. Orders for 1" diameter rods should specify whether couplings JB-86 (2 1/16" O.D.) or JB-88 (2" O.D.) are desired.

CHEMICAL PROPERTIES

Conditions	Grade	Carbon	Manganese	Phos. (Max.)	Sulphur (Max.)	Nickel	Moly	Chromium
Non-Corrosive	30	.35–.45	.75–1.10	.045	.055	.....	.....	.....
	40	.30–.40	1.10–1.40	.04	.05	.....	.....	.....
	50	.30–.40	1.60–1.90	.04	.05	.....	.....	.....
Corrosive and Sulphide	71	.27–.32	.50–.80	.04	.05	1.00–1.50	.....	.45–.75
	81	.20–.25	.40–.70	.04	.05	1.65–2.00	.20–.30	
	91	.15–.20	.40–.60	.04	.05	3.25–3.75	.20–.30	

PHYSICAL PROPERTIES

Conditions	Grade	Heat Treatment	Yield Point, psi.	Ultimate Strength, psi.	Elong. 2", %	Elong. 8", %	Reduction, %	Brinnell	Impact Izod, Ft. Lbs.
Non-Corrosive	30	Fully Normalized	50,000–60,000	80,000– 90,000	32–38	19–23	50–60	155–180	50–75
	40	Fully Normalized	60,000–70,000	95,000–105,000	28–35	19–23	50–65	180–205	60–85
	50	Fully Normalized	70,000–80,000	105,000–120,000	30–37	17–22	55–70	200–225	55–85
Corrosive and Sulphide	71	Fully Normalized and Fully Tempered	60,000–70,000	85,000–100,000	32–40	17–22	58–68	180–205	70–85
	81	Fully Normalized and Fully Tempered	65,000–75,000	85,000– 95,000	33–40	18–24	60–70	180–205	85–105
	91	Fully Normalized and Fully Tempered	70,000–80,000	85,000– 95,000	35–43	19–23	65–75	185–205	95–107

Field Executives
dents

on the casing threads, the thread protectors were removed and both male and female threads cleaned with wire brush and solvent just ahead of the actual tailing of the pipe into the derrick. Application of a joint sealing compound, made just before the pipe was tailed into the derrick, aided in insuring tight joints with a minimum period in which dirt—carried by the high wind which harassed the running of nearly the entire string—could find its way into the threads.

A casing contractor's crew was on the job throughout the running of the string, being supplemented by two of the three regular drilling crews.

(Additional pictures on pages 24, 26, and 30)

Tongman Long, at left, was really pushed as he handled two lines on the one cathead. He not only ran the tail-in line as each joint was dragged into the derrick, but also manipulated the turns of the endless spinning line as each of the long threaded junctions was pulled up as tightly as possible before the slower tonging process began.

Three wraps of the line on the cathead (below) sufficed for most of the tonging, but the last half turn or so of the long threads was made with a fourth wrap and the traditional double jerk to signify that the cathead man considered the joint properly run in. As usual, while the joint was being set snug the driller watched the derrickman for signal to begin lowering the string into the hole.

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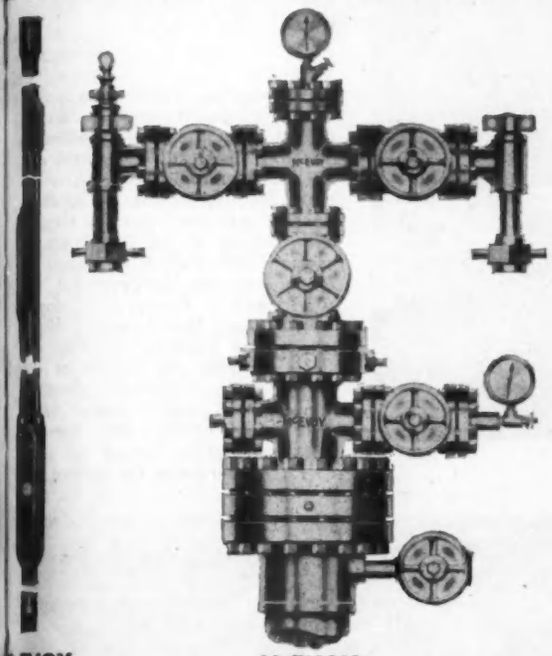

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Progressive oil men know this and are eager to use the tools that war-sharpened experience, better design and better materials have made possible.

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This double-tough inspection control, plus extremely close-tolerance precision manufacturing provides perfect interchangeability, eliminates misfits, saves time, and assures trouble-free equipment on the lease.

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McEvoy COMPANY

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H O U S T O N T E X A S

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The third tour missed out when the camera caught the event of drilling to record-breaking depth, and so did not appear with the other two crews in The OIL WEEKLY's April 24 pictorial story on Price 1. But the tour on the casing job brought the "night owls" into the daylight, and they are shown at left after the strenuous job of casing and cementing was done. They are, left to right: Jess Leatherwood, driller; Charles Powe, roughneck; Walter Stapp, pipe racker; R. L. Tucker, engineman; Horace Green, derrickman; and Deb Herring, tongman.

The cementing trucks were closely and strategically grouped around the cement stack, with individual discharge lines extending to the derrick floor manifold. The job, which broke previous records for depth of cement set, was carried through from slitting of the first sack to pumping the last of the slurry in 28 minutes, an indication of the high degree of teamwork developed in handling the cement. High-temperature sulphate resisting cement was used, the weight of the slurry being checked carefully throughout the run to obtain conditions suited to the 240° bottom-hole temperature known to exist 15,279 feet below the surface.

McCullough
GUN PERFORATOR
COMPLETION METHODS
Brown Line Print No. 8

Oil!

. . . DEEPEST PRODUCTION EVER FOUND IN OKLAHOMA

Carter Oil Company's deep discovery well, No. 1 Cottingham in McClain County, Oklahoma, w as tested and production discovered below 10,600 feet with a McCullough Combination Gun Perforator and Tester.

The photograph at left illustrates the Gun Tester used to make the discovery. The method of operation commonly followed is to set the casing through the oil and gas zones and cement it solid. Then, perforating and testing of each zone is accomplished with a single run of the tubing. Careful pipe measurements are used to assure location of the perforations in the EXACT ZONE DESIGNATED. An accurate gauge of the productiveness of each zone is obtained because it is tested *immediately after perforating* and while it is under formation pressure only.

The solid cement sheath eliminates water trouble, protects and supports the casing, and greatly simplifies squeeze cementing of any zones to be closed off after testing.

Ask any experienced McCullough field man for further information on this successful completion method, or refer to the McCullough section in your 1944 Composite Catalog.

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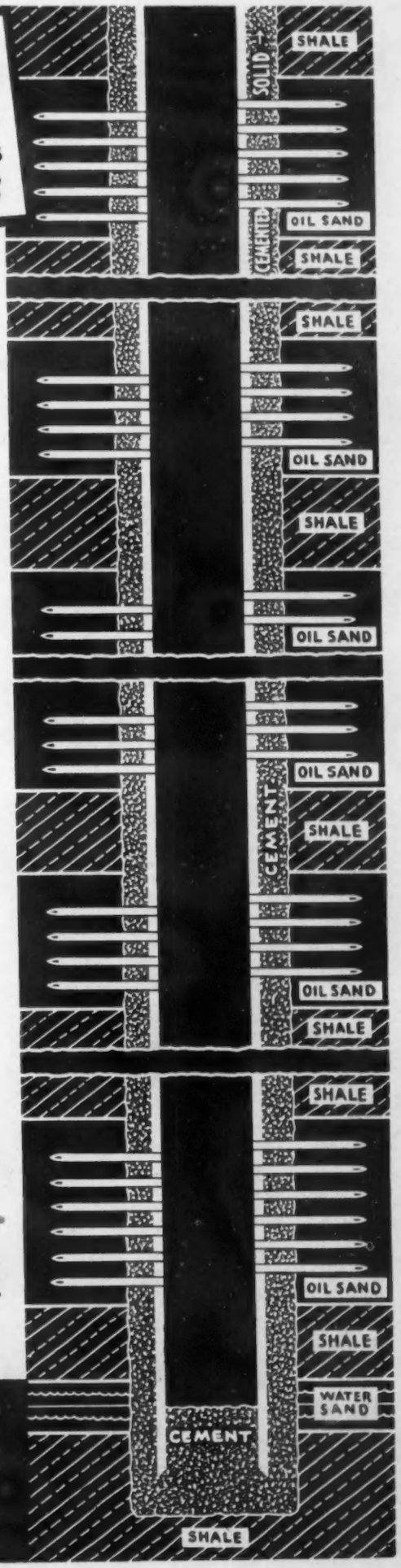
McCullough
GUN PERFORATOR



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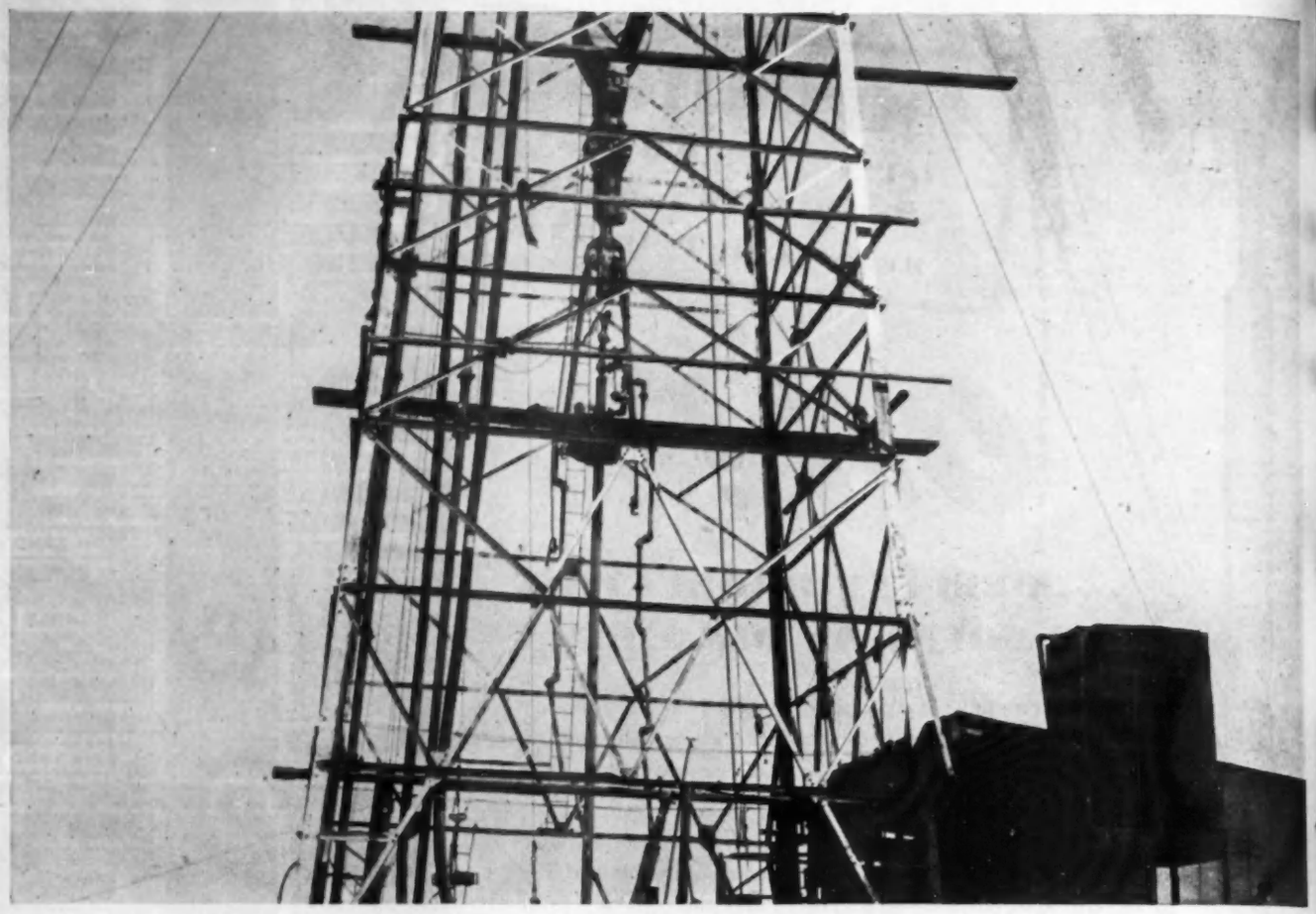
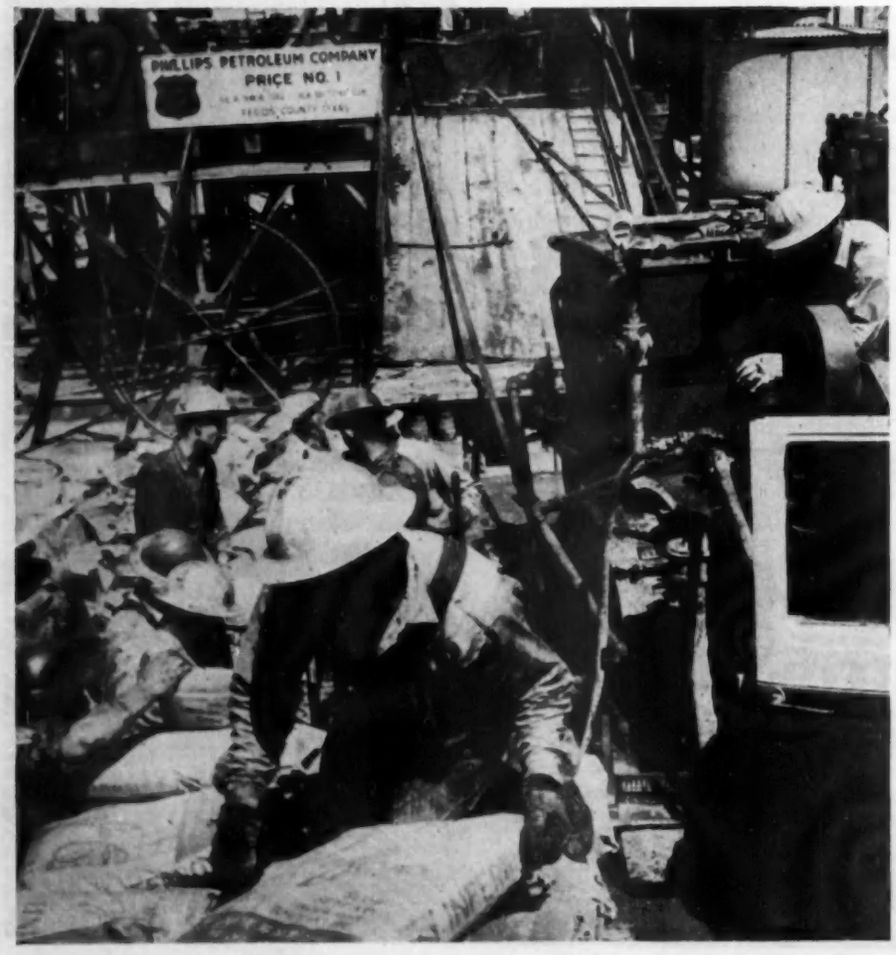




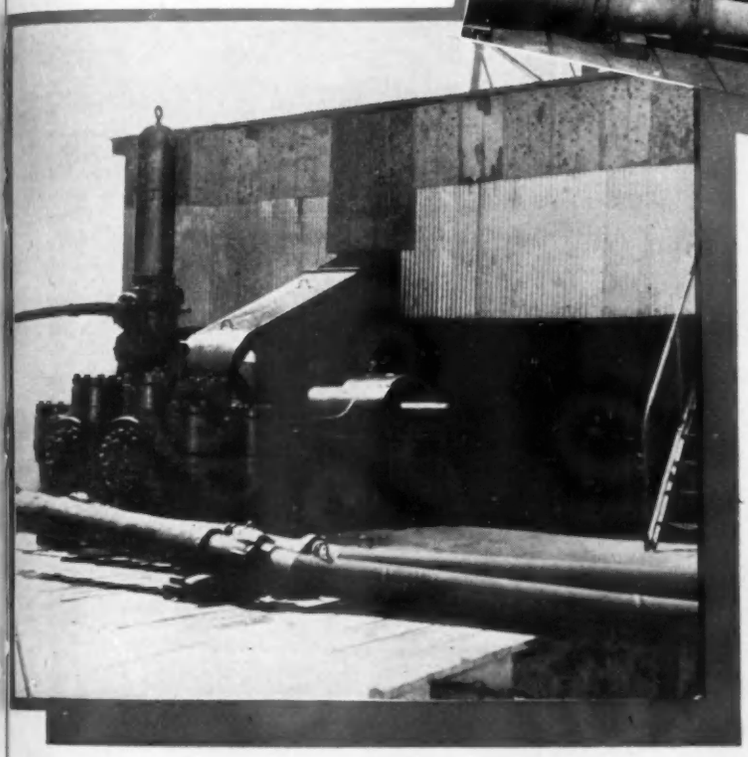
The two photographs on this page show the circulating and cementing hookup on Price 1 after the record-breaking string had been suspended at 15,278 feet, just one foot off bottom of the world's deepest well. Two of the cementing lines went up the tool ramp to the derrick floor, while the third line can be seen rising behind the blowout preventer handwheel. The cementing manifold and connection to one of the rotary hoses were on the derrick floor, with final control at the tie-in to the fittings atop the casing string. The lower picture also shows a closeup of one of the cementing crews, illustrating the division of detail work which enabled each crew to slide across the slitter and dump into the hopper at better than a 10-sack-per-minute average for the entire duration of the cementing run.

GARDNER-DENVER Slush Pumps

On the World's Deepest Well

Phillips Petroleum's Price No. 1

All the Way



Gardner-Denver FXL Power Slush Pumps have been used all the way on Phillips Petroleum Company's Price No. 1. In helping set new records on the world's deepest well, Gardner-Denver Pumps have again justified their reputation for top performance under toughest of today's deep-well operating conditions.

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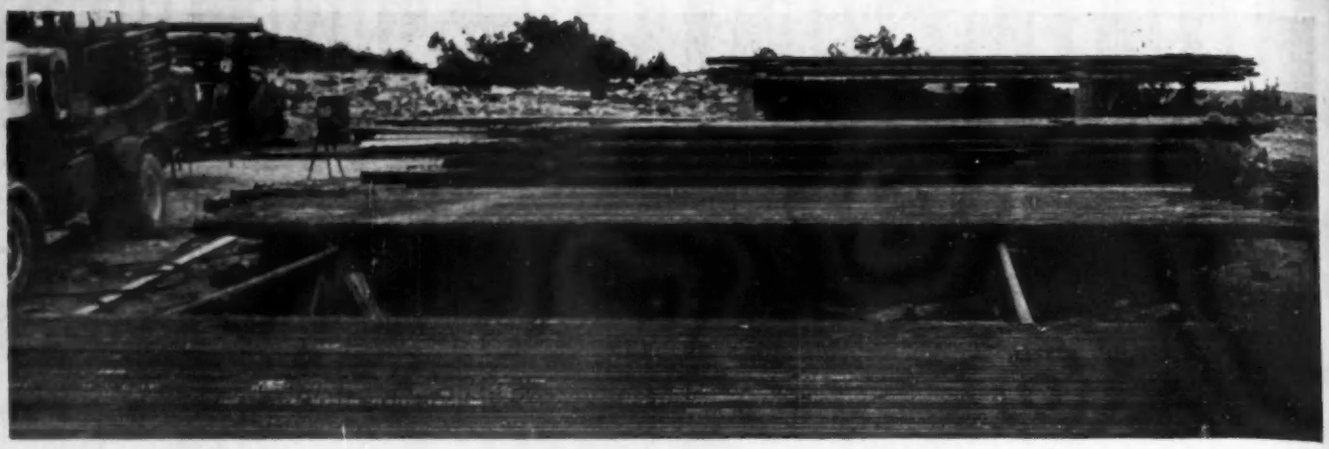

The casing, in three weights and five separate lots to afford quick classification while running the doubly tapered string into the well, was laid out in a series of racks stretching far back across the brow of the hill on which Price 1 stands. Any lowering of the pipe was kept under careful control, to avoid the possibility of setting up an overstressed area which might result in damage to the string.

Casing run in this well was handled with exceptional care. When lowering pipe from a pile onto the runways preparatory to tailing in, each joint was suspended in twin loops of rope until it rested on the rails. Thread protectors stayed on the pipe until after all shifting was over.

On a level section of the rack just ahead of the runway to the ramp, the the thread protectors were removed. Both threads were cleaned carefully with wire brushes and solvents. The male thread was then again covered with the protector to safeguard the threads up the ramp and to the last moment before stabbing.

WORLD'S DEEPEST WELL CEMENTED WITH 1000 SACKS OF INFERNO

Phillips Petroleum Company's Ada C. Price No. 1, Pecos County, Texas, cementing casing at 15,279 feet on May 11 with 1,000 sacks of Trinity Inferno.

TRINITY PORTLAND CEMENT COMPANY

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TRINITY FIBRE • TRINITY MIX • TRINITY WHITE, PLAIN AND WATERPROOFED

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Selective Plugging Of Oil Sands

PART 1—Treatment of Injection Wells

By S. T. YUSTER and J. C. CALHOUN*
Secondary Recovery Research Laboratories, School of Mineral Industries
Pennsylvania State College

OIL RESERVOIRS are made up of porous rock formations which almost always consist of several strata of widely differing permeabilities. These strata may be separated from one another by layers of shale which are impervious to either horizontal or vertical fluid movement. The porous strata in such a geological sandwich may act almost independently of one another so far as flow into and from them is concerned.

This variation in the fluid conductance of the strata is a decided disadvantage at times and it is highly desirable that methods be available for smoothing out the heterogeneity of a producing sand body. Several such methods will be briefly mentioned.

There are certain techniques available which have been used to overcome the disadvantages of a heterogeneous permeability profile which are applied during the development stage of an operation. One of these involves the use of a corrective shot on the well. In this method explosive shells of varying diameter are placed opposite the producing formation in such a manner so as to give a high charge concentration opposite the strata of low permeability and a low charge concentration opposite the strata of high permeability. The size of shell is determined by the shot responsiveness of the formation and the effective well radius desired opposite the stratum in question. The change in effective well radius will cause the production or injection rate to vary accordingly. From a theoretical standpoint this technique makes it possible for the different strata to behave almost as one stratum as far as rate of production is concerned.

Another technique which has found application in secondary recovery is development by delayed drilling. In this method the injection wells are drilled first and the driving fluid is introduced into these wells for a suitable length of time. This pushes oil toward the center of the element patterns where the future producing well will be located. The oil from the more open strata will be pushed to this area first but since it can go no further, it must stop and the oil from the lower permeability will migrate to this area as well, even though it is done more slowly. This allows the slow strata to catch up with the faster ones and the producing well is drilled when the center accumulation is just right.

A third method requires application of a multiple packer system which brackets the sand generally according to permeability. By proper manipulation of a valve system, it is possible to control the fluids being produced by or injected into the various strata.

These three methods for correcting some of the difficulties that accompany production from a heterogeneous permeability profile are in common use today. In some cases the application is limited and in others it is even impossible. In all cases, however, the technique must be applied during the early life of the operation. A fourth technique which does not have this limitation is selective plugging which will be discussed in this paper. Plugging methods which necessitate placing plugging agents into a stratum by mechanical means will not be considered here. Only those methods which owe their selective action to some special property of the formation or formations in question either in degree or kind will be discussed. In addition application of these techniques to secondary recovery will be stressed.

By-Passing in Water Flooding

In the secondary recovery of oil by water flooding in an area having a heterogeneous permeability profile, the highly permeable sections water out first. Those strata which have had the largest part of their producible burden of oil swept from them will continue to take water at the input wells and produce this water at the producing wells while the low permeability strata may be in the process of producing, or have not as yet begun to produce, their oil. The lower permeability sections will not be harmed, in general, by the presence of the open sections but will take the flood water at the normal rate as determined by their effective permeabilities.

There is one further disadvantage in such a situation which is sometimes overlooked. Unless a well with high water production is pumped off continuously, a head of water will build up in the producing well and penetrate into the lower permeability sections which have not begun to produce their oil as yet. This reverse flood from the producing well into the sand creates a water barrier in the tighter strata which will make it difficult for the future production to penetrate into the well.

This excess water which is being handled through the high permeability section, must be obtained from some source, processed, pumped into the stratum, pumped from the producing well, and handled with the oil produced. Not only do these various steps cost money for which there is little return but in addition, equipment of larger capacity is necessary under such conditions, or operations proceed at lowered efficiency due to underequipping.

Although the loose streak may be an advantage when flooding is first started, in that production begins in a relatively short time after injection, and therefore gives an early return on the investment, once water breaks into the producing well the high permeability sections become a decided disadvantage. In fact, the water-oil ratios may become so high that it is impractical to continue production even though the yield of oil from the less permeable sections may be of economic proportions. Under the circumstances, it would be highly desirable either to shut off or reduce the overall conductivity of the higher permeability strata which have produced practically all of their oil with a minimum effect on the lower permeability strata which still have oil to produce. If such were possible, it would mean the postponement of abandonment of the property, the conservation of an important national resource, and the continuation of profitable production.

A great number of selective plugging methods have been applied in water flooding with varying degrees of success. Some of them have failed because of the lack of selectivity in that plugging took place in all the strata. Others were unsuccessful because of lack of stability of the plug. It would be of interest to examine some of the chief methods which have been used in order to determine their characteristics and, therefore, their limitations.

Cement Plugging

The commonest plugging method which has been used in water flooding is injection of a suspension of small particles such as Portland cement into the input well. Since water enters the loose formation at a more rapid rate than any of the other strata, the small particles will tend to enter it and reduce its permeability. Since the water is entering all of the strata in proportion to their effective permeabilities, the plugging particles are acting on all the formations. The tendency is, therefore, to reduce the conductivity of all the strata, but as will be shown later, the reduction, is greater the higher the permeability.

Since the capillaries in a high permeability sand are larger than in a low permeability sand, it should be possible theoretically to choose such a particle size so that it will enter one and plug it and not enter the other at all. Unfortunately, the powders which have been used for field plugging were not of uniform particle size. Upon being introduced into the well, the larger size grains may settle more rapidly in the tubing so that there will be probably a segregation of sizes by the time the slurry reaches the sand face. The larger particles would be the first to go into action opposite the sand face. If they were large the large majority of them might settle to the bottom of the well. Succeeding sizes would approach the sand face and enter the capillaries if they were of the correct size or plate out on the surface if they were too large. When the finer particles finally

*Presented before Independent Petroleum Association of America at Bradford, Penn., on April 28, 1944.

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Easy to Bend
Long Lengths

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NORMALIZED CASING AND TUBING

reach the sand face, what is equivalent to a gravel pack has been formed by the coarser particles which prevents the small sizes from penetrating the capillaries and exerting their action. While this action may result in some decrease in permeability (in cases where there is an extremely high permeability sand), in general the plug will not be stable, and back flowing will remove a good portion of it.

This behavior was checked in some laboratory tests in which a slurry of a commercial grade of Portland cement was used as the plugging agent. Cores in the permeability range of 128 to 2550 md. were used. It was found that application of the slurry to the cores gave no decrease in water throughput on the lowest permeability and about a 40 percent decrease on the highest permeability. A definite cake had formed on the surface but backflowing removed it easily and the water rate returned to about 95 per cent of the original value on the more open core. Some of the slurry was diluted with a large volume of water and the larger particles allowed to settle out until a definite size and under remained suspended. This suspension was used to treat the cores and again there was no plugging on the low permeability but a 22.1 percent reduction in the high permeability. Upon backflowing part of the plug was removed and that final rate was 92 percent of the original. No detectable filter cake was noticed on the cores which had been plugged indicating that the material had entered the capillaries. Only a small amount of the suspension was required for this action, in fact, a much smaller quantity than in the case of the untreated slurry.

The greater initial plugging (before backflow) by use of the straight cement slurry as compared with action of the elutriated cement is due to the much larger quantity of cement used. However, the plug was not as stable, nor was the final plugging action (after backflow) as great as in the case of the elutriated cement. Only 12 percent of the original plug remained after backflowing when the slurry was used as compared with 36 percent when the fines were used. This points to the necessity of using closely fractionated powders for effective plugging.

The size of particle needed for the plugging action was determined by the use of this equation:

$$(1)\quad r = 8.85 \times 10^{-3} \sqrt{\frac{k}{f}}$$

Where r is the capillary radius in centimeters in a sand having a permeability of k millidarcies and a fractional porosity of f. This has given fairly satisfactory results in the laboratory. A grain size should be chosen which is under the capillary size of the formation to be plugged but above that which does not require the plugging action.

Some laboratory work was done on increasing the effectiveness of the cement plug by addition of a material which would cause the cement particles to swell when they are in the sand. Such a reagent is sodium silicate. No field tests were made on this but use of this material in conjunction with carefully fractionated powders such as cement warrant further consideration.

Both laboratory and field tests have been made using bentonite clay with some degree of success. In general bentonite is a much finer material than cement and should therefore be more useful in plugging lower permeability sands.

Some laboratory tests were made using a suspension of a commercial bentonite on sandstone cores the maximum permeability of which was 24 md. Only this highest permeability core showed any plugging and this was eliminated by backflowing indicating that there was no penetration.

From these experiments it would seem that particles of a very small size are necessary for plugging sands in the lower permeability range. The apparent successful application of suspensions of materials such as cement in wells which do not have permeabilities as high as were used in the tests mentioned here indicates that plugging possibly may not be simply a penetration of particles into capillaries. Since the wells have been shot, the suspension may enter the shot fissures, and reduce the effective radius of the well to the greatest extent opposite the formations taking the greatest quantity of water. This would be a selective plugging.

Wax Distillate

Another physical method of plugging which has been used with some success in water flooding operations is application of wax distillate. This neutral oil fraction of the crude with a suspension of wax flakes in it is injected into the input well either at the outdoor temperature or it is heated to dissolve all wax before injection. Heating is necessary in cold weather so the material will pour into the well. It has the added advantage of forming fine wax crystal during its fairly rapid cooling as it goes down the tubing. The small crystals of wax, are better for plugging than the larger ones in that they have a better chance of penetrating the capillaries of the sand.

Wax distillate treatment can only be used on a well which has a fairly rapid water input rate. This is because the distillate is lighter than water which fills the tubing. Consequently, it tends to stay at the top of the tubing and a rapid downward velocity of water is necessary to carry it to the sand. The downward velocity of water can be increased by use of smaller tubing for injection which would be placed inside of the regular tubing.

In general, use of wax distillate plugging is limited to strata that are in the upper part of the producing horizon. The reason again is due to the fact that the distillate is lighter than water and just as soon as it reaches the shot hole opposite the producing sand, the downward velocity is greatly decreased and distillate drifts upward to top of the sand. It is then forced in by the water pressure. It can be seen that the action is definitely selective for the upper part of the sand.

From this mechanism it is possible to calculate the quantity of wax distillate necessary to accomplish the plugging. The volume of wax distillate needed is slightly greater than the volume of the well between the packer and the bottom of the stratum to be plugged.

If the formation which is to be plugged is not too open the wax distillate will not be too stable. Fluctuation in pressure and backflowing will remove it in some cases. However, in high permeability sections it has shown excellent results.

Bottom sediment from which suspended matter has been removed has been used by some producers for plugging with questionable results. While it is somewhat similar to wax distillate, it will congeal before getting to the sand face and result in a very haphazard action. Dissolving such material in a carrier such as gas oil might be satisfactory.

Paper Pulp

Suspensions of paper plup in water have been used with only fair success in plugging. The difficulty with this method is that it forms a cake on the face of the sand which falls off the first time the input pressure varies or when backflowing takes place as for example when the well is repaired.

A plugging method developed by R. S. Pringle, Jr., of Bradford, which has given surprisingly good results at times has what appears to be a very unorthodox makeup at first glance. It is composed of water, lye, old crank case oil, fine sawdust, and sometimes aluminum powder. Examination of the formula will indicate a fairly definite function for each constituent. The old crank case oil is an oxidized product containing organic acids which can react with the lye to produce emulsifying agents. These agents emulsify the remaining oil with the water and the fine sawdust which would be modified by the lye would be carried with the emulsion. The aluminum powder (when it is added) reacts with the lye to give a gelatinous precipitate of aluminum hydroxide. The combination should be effective when a high permeability stratum is present in a well.

Another group of plugging agents depend upon a chemical reaction for their sealing effect. This chemical action may take place between two chemicals which are injected separately or together into the formation or the reaction may be between a chemical and some material in the sand. In the case of two injected chemicals almost any two that will form a precipitate can be used. For example, calcium chloride and sodium carbonate could be the reactants. The calcium chloride could be injected first and it will go to the more open sections in greatest amount. This should probably be followed with a small amount of water to wash it off of the sand face. The sodium carbonate solution would then be injected. A precipitate would form wherever the two solutions came into contact. Since this contacting must take place in the sand itself the mixing of the two solutions will be definitely limited and it will be further retarded by formation of any precipitate. It is felt that any plug formed under such conditions will not be too selective.

It is possible to overcome the disadvantage of limited mixing of the reagents by delaying formation of the precipitate for a sufficiently long time to allow the mixture to be pumped into the formation. After a time the reaction will be complete and a gel will be formed in the pores of the sand. An appropriate mixture of a water soluble silicate and some acidic material will accomplish this. The disadvantages are (1) that all the formations which are penetrated are almost completely sealed

■ CONTINUED ON PAGE 42

Equipment Corrosion in High Pressure Wells

Corrosion is brought about by water made acid through solution of carbon-dioxide from gas, studies disclose*

By WALTER F. ROGERS,
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THE problem of corrosion of equipment of high-pressure wells has received considerable attention within the past two years. Bacon and Brown[1] discussed this subject before the N.G.A.A. in April 1943. This paper dealt with the corrosion attack experienced primarily by the Christmas trees and adjacent portion of the flow equipment of wells in the Opelika, Texas, field. The corrosion experienced and remedial measures taken in this field were further discussed by Simons.[2] On December 2, 1943 a meeting was held under auspices of Lone Star Producing Company at Dallas, Texas, to further discuss this subject, and it was developed that condensate fields other than Opelika were suffering from corrosion of well equipment. The corrosion rate was reported as being severe in some fields although slight in others.

Corrosion of oil well subsurface equipment is as old as the industry. Seldom, however, have these corrosion problems approached the economic importance of corrosion of high-pressure-well equipment. This economic importance is largely latent but is nevertheless a real possible danger. Value of physical equipment involved may not be too large if the only losses are portions of the Christmas tree or adjacent equipment but the large damages which may result if a high-pressure well blows wild as the result of corrosion attack are recognized.

Oil Well and Condensate Well Waters

As a portion of the effort to obtain a solution to this problem, waters from condensate wells have been examined to determine their chemical properties. Table 1 gives analyses of waters from six individual wells and one composite sample from four wells. In addition to the chemical analyses data on the water and condensate production per million feet of gas are included.

In comparing these waters with fluids from oil wells four factors have been noted. The first is that the pH values of the condensate waters vary from 5.0 to 6.2. Second, the iron content varies from 8.5 to 250 p.p.m. with the majority of the fluids having iron contents of 150 p.p.m. or greater. Third, all the usual ions found in oil-well waters are present and the order of concentration i.e. sodium greatest, calcium second and magnesium third is the same as for oil-well waters. Fourth, the total dissolved solids including iron vary from 0.286 to 22.75 grams per liter.

It is difficult to select from all the oil-well waters which have been analyzed those which should be offered for comparison. A short list of waters has been selected which cover the greatest range of dissolved solids determined in oil-well waters by this laboratory. These data are given in Table 2 for seven fields and cover both sulfide and non-sulfide areas. Using these analyses comparison is made of the same four features as noted for condensate wells. First, the pH values for oil waters vary from 6.2 to 7.20. The same property for condensate waters ranges from 5.0 to 6.2. Thus condensate waters are slightly more acid than those produced with oils. The second value is the iron content and this concentration varies for oil waters from 9 to 32 p.p.m. These iron contents slightly overlap the range of iron values for the condensate waters but beyond this slight overlapping the condensate waters have much greater iron concentration. The third factor, that of order of concentration of cations and anions is the same for both condensate and oil waters. The fourth factor is concentration of dissolved solids. The seven condensate waters have dissolved solids ranging from 0.286 to 22.7 grams per liter. Oil waters have dissolved solids from 7.5 grams per liter to 122 grams per liter. Thus while in general the condensate waters have lower salt concentration some of them have greater total dissolved solids than do some oil waters.

As a general summary the condensate waters have a lower pH value, a greater iron content and a lower dissolved solids content than do oil waters. However none of these citerion for identification hold definitely and they cannot always be used for positive identification of a condensate water as against oil water.

Sources of Water From Condensate Wells

Since waters from condensate wells vary so widely in chemical composition it is of interest to examine sources of the water. Sage and Lacey and coworkers[3,4] have determined the dew point composition of gas in methane-water and in ethane-water mixtures. These studies were made at temperatures ranging from 100° to 460° F. and from pressures of 200 to 10,000 p.s.i. Studies of both these systems show essentially the same phenomena, i.e., at elevated pressures water vapor pressure present in gas is greater than would be expected at that temperature based on normal vapor pressure of water. This increased amount of water vapor is less the greater the temperature. Although these data show that more than the normal expected amount of water is present in high-pressure gases they do not indicate that water will be precipitated either in the formation or well equipment solely as a result of pressure reduction. Water present in high-pressure gas precipitates out on well equipment through reduction of gas temperature. Since the gas is subject to lowering of temperature through pressure reduction when produced up the well and through heat exchange to the confining equipment, water is condensed out from these effects. This condensed water, however, would necessarily be of high purity and it is the presence of such water which accounts for the low dissolved salt contents found in many condensate-well aqueous fluids.

The question then arises as to the source of salts found in varying degree in all condensate waters. Undoubtedly

TABLE 2
Analyses of Waters Produced With Crude Oils

	Cleveland, Texas	Wink, Texas	East Texas	Tinsley, Miss.
pH	6.70	6.80	7.20	6.65
Iron	14.0	None	9.0	32.0
H_2S	None	224	None	None
Sodium	38,600	1,925	22,900	43,600
Calcium	1,374	542	1,024	3,800
Magnesium	179	11	480	192
Chloride	61,820	1,896	38,750	74,400
Sulfate	None	2,450	445	None
Bicarbonate	372	452	1,145	219
Total	102,359	7,500	64,753	122,242

	Salt Flat, Texas	Smackover, Arkansas	Anahuac, Texas
pH	6.2	6.6	7.15
Iron	None	27.0	None
H_2S	550	None	None
Sodium	11,610	21,400	38,850
Calcium	2,095	5,700	2,380
Magnesium	825	840	374
Chloride	23,230	45,376	65,020
Sulfate	440	Nil	20
Bicarbonate	850	300	177
Total	39,600	73,643	106,847

TABLE 1
Analyses of Waters Produced with Condensates

	Well No. 1	Well No. 2	Well No. 3	Well No. 4	Well No. 5	Wells 6 to 9	Well No. 7
pH	6.2	5.9	5.0	6.2	5.75	5.95	5.75
Iron	176	150	8.5	220	25	260	250
Sodium, p.p.m.	499	40	96	12	42	2,910	8,510
Calcium, p.p.m.	20	4	130	7	2	464	210
Magnesium, p.p.m.	6	Nil	28	Nil	Nil	171	70
Chloride, p.p.m.	723	36	426	6	28	5,740	13,640
Sulfate, p.p.m.	24	5	5	Nil	Nil	5	Nil
Bicarbonate, p.p.m.	140	50	54	43	67	107	76
Total p.p.m.	1,588	286	747.5	288	164	9,657	22,756
Water, Bbl. per MM cu. ft.	.232	.240	.024	.074	5.0	0.88	1.5
Condensate, Bbl. per MM cu. ft.	3	3	3	2.5	18.9	27.4	6.0
Date	8-1-43	8-1-43	8-2-43	8-3-43	8-10-43	7-2-43	9-19-43

* Paper presented at First annual meeting National Association of Corrosion Engineers.

in high-pressure gas and single-phase reservoirs some connate water is present. This water in common with all connate waters contains the usual and typical salts common to connate and formation waters found in oil horizons. Some of this connate water may be carried from the reservoir by produced hydrocarbons in form of mechanically entrained droplets which become absorbed in the condensed water and contribute dissolved salts. Salt composition of the finally obtained separator water then will vary with the amount of connate water produced. In this manner the condensate water will vary anywhere between that of a relatively pure fluid to one which by chemical analysis has the same dissolved salts concentration as that of a typical oil water.

Following the change in chemical composition with time of water produced from condensate wells has been done over a short time for one well. (See Table 3.) Reference shows that the first sample taken about seven months after the well was drilled had a chloride ion concentration of 5312 p.p.m. and a pH of 5.3. Since that time the salt concentration has gradually increased until the chloride ion concentration is now 35,100 p.p.m. In addition the pH value of the water has increased to 6.50. Aside from the iron content of the water which persists at about 250 p.p.m. there is no difference in the chemical composition of the water and that of many waters produced along with oils.

TABLE 3

Variation of Chemical Composition with Time of Water from Well No. 7

DATE	Water Bbl./ MM Cu. Ft.	Bottom Hole Pressure p.s.i.	pH	Iron p.p.m.	Chloride p.p.m.
8- 1-43....	0.25	2,400	5.3	100	5,312
9- 3-43....	1.50	2,400	6.2	280	12,090
9-19-43....	1.50	2,400	5.75	250	13,640
1-29-44*...	1.60	2,400	6.25	385	26,400
2-11-44....	1.51	2,400	6.25	—1	31,200
3- 2-44....	2.77	2,400	6.50	—1	35,100

* Second days production after 29 day shut-down which may have effected iron content.

1 Iron measurement of no value for this table.

Production rate:—1.0 to 1.5 MM cubic feet of gas per day.

Development of Acid Condensate Waters by Carbon Dioxide

One of the unique properties of several condensate fluids examined is the effect of oxidation of iron in the water upon the fluid pH value. Samples of fluid from well No. 5 and of wells 6 to 9 were taken fresh from the high-pressure separator. The original pH value was measured. The samples were then allowed to stand undisturbed in contact with air which resulted in the slow oxidation and precipitation of the ferrous iron. The pH values of the fluids were measured from time to time. During the time interval of standing no appreciable evaporation loss occurred. The data on variation of pH with time are:

	Well No. 5 pH	Wells No. 6 to 9 pH
7-16-43 (Sampled)	—	5.95
8- 3-43 (Sampled)	5.75	4.62
8- 6-43	5.45	4.60
8-10-43	5.30	—
8-16-43	4.65	4.60
8-19-43	4.65	4.60
8-20-43	4.70	4.60

On August 20 the acidity of each sample was determined and calculated as carbonic acid. The results were:

Well No. 5, 65 p.p.m. H_2CO_3 or 0.00105 g. moles/liter.

Wells No. 6 to 9, 152.5 p.p.m H_2CO_3 or 0.00296 g. moles/liter.

Now using the relationship:

$H^+ = \sqrt{K_1 C}$ where

H^+ = Hydrogen ion concentration

C = Concentration of carbonic acid in gram moles per liter.

K_1 = First dissociation content of carbonic acid $= 3 \times 10^{-7}$ and substituting the values of carbon dioxide concentration obtained by titration the calculated pH values of the solutions became

Well No. 5 pH value = 4.75. This compares favorably with the actually measured value of 4.65 to 4.70.

Wells No. 6 to 9 pH value = 4.71. This compares favorably with the actually measured value of 4.60.

In order to establish presence of carbonic acid in the water a quantitative test was made for this compound. Apparatus consisted of a liter erlenmeyer flask with a glass-tubing entrance and exit through a rubber stopper in the mouth of the flask. The exit glass tubing led to the bottom of a 25 ml. test tube. The apparatus was first purged of air by blowing nitrogen through both the flask and the tube. The test tube then was filled with filtered clear barium hydroxide solution and nitrogen passed through the empty flask and into the barium hydroxide. No precipitate was developed in the barium hydroxide showing freedom of the nitrogen from CO_2. Five hundred milliliters of water from wells 6 to 9 were next added to the erlenmeyer flask plus a small amount of hydrochloric acid to release the carbon dioxide from the ferrous bicarbonate. Continued passage of nitrogen through this water and into the barium hydroxide soon swept sufficient carbon dioxide into the hydroxide to develop a heavy white precipitate of barium carbonate.

In order to show more definitely how the pH values of these waters vary with change in the iron content a fresh high pressure water sample was obtained. The pH value and iron content was followed from time to time after exposure of the sample to the air. The results of this test are:

Water sample from wells 6 to 9

Date	Iron p.p.m.	pH
1- 6-44 (Sampled)	200	5.60
1- 7-44	175	5.20
1-11-44	150	4.95
2- 9-44	60	4.45

This shift in pH from 5.60 down to 4.45 represents in reverse the corrosion reaction which occurs to the steel well equipment. This reaction is represented by the equation $4Fe(HCO_3)_2 + 10 H_2O + O_2 \rightarrow 4 Fe(OH)_3 + 8 H_2CO_3$. In this reaction the ferrous hydroxide precipitates leaving the carbonic acid free which ionizes to decrease the pH. This low pH value of 4.45 represents a distinctly acid condition. It is reported that carbon dioxide contents of gases from condensate wells runs as high as 2 percent. Two percent of a well pressure of 2500 p.s.i represents a partial pressure of carbon dioxide of 50 p.s.i. These data indicate that the major cause of the corrosion of the equipment of high-pressure wells is primarily a case of corrosion by waters made acid through solution of carbon dioxide from the gas. The reactions represented are:

$H_2O + CO_2 \rightarrow H_2CO_3$

H_2CO_3 (Excess) $+ Fe \rightarrow Fe(HCO_3)_2 + H_2CO_3 + H_2$

The pH value of the water laden with carbon dioxide when first laid down may be of the order of 4.50 or less depending on the carbon dioxide content of the gas. Water at this pH value has been shown by Whitman et al[5] to corrode iron with spontaneous liberation of hydrogen which means that the reaction proceeds constantly and at a high rate. As the carbon dioxide content of the water is reduced in the corrosion reaction and the bicarbonate content increases the pH of the water likewise increases and the corrosion rate decreases. Thus the final pH values of the waters as sampled and found to be 5.5 to 6.2 while still acid are not as acid as at some prior time in their history in the well equipment. It would be expected that those high-pressure gas wells which have not suffered corrosion are either wells producing gas of low carbon dioxide content with the result that the pH value of the water is insufficient to give hydrogen liberation to develop a high corrosion rate or that the pressure-temperature relations of the gas are such that water is not precipitated until the top hole equipment is passed.

The most serious corrosion reported to high-pressure well equipment has been to the top few joints of tubing and to the Christmas tree and associated equipment. This is evidently the result of precipitation of water from the gas prior to and in reaching this area, the precipitation resulting from the lowered temperature of the gas through both expansion from pressure drop and heat loss to the walls of the confining equipment. This precipitated water develops acidity through contact with the carbon dioxide of the gas. The constant impingement of this acid water against the metal equipment results in bathing these metal parts with an acid solution. This action combined with the high temperature of the gas and a relatively high gas velocity results in rapid corrosion attack. This, in general, explains the cause for the severe corrosion obtained. One remedy therefore is the use of alkaline treating materials to raise the pH of the water which should be brought to pH 8.0 at least. Even under this condition some corrosion will occur because of the high temperature and velocity of the gas, but its severity will be greatly diminished. While the general conditions which result in corrosion are as outlined there may be apparent anomalies among wells which on the basis of incomplete data do not conform to any consistent corrosion therory. It is believed, however, that when the facts as to the gas carbon dioxide content, the area and amount of water precipitation, and the temperature are known, the corroded areas will be found to be a function of these factors.

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BRANCH STORES AT ALL IMPORTANT PLACES IN THE OIL COUNTRY

Expansion of Cycling Plants Unlikely Without More Reserves

Study of economics of natural gas cycling plants* also shows that they have a striking advantage as a source of 100-octane motor fuels and other finished products

By J. M. FLAITZ, Manager, Distillate Production Corporation

BEFORE reviewing the development of cyling operations, I will first define cycling to which the discussion and data that follow are limited. Natural-Gas cycling or recycling consists of producing natural gas which exists in a vaporous state in the reservoir, extracting certain liquefiable hydrocarbons and returning the denuded gas to the same reservoir from which it was produced. Gas-cycling operations were first introduced on a commercial basis during the latter part of 1937 and the first plants were built in 1938. This part of the petroleum industry is, therefore, only six years old. Development at present is entirely confined to Louisiana and Texas. In California one cycling plant is now nearing completion and another is under consideration.

In Louisiana and Texas at the end of 1940, 24 plants were in operation and 5 were under construction. At the present time, in the same states, there are 53 plants in operation, 1 nearing completion, 3 under construction, and 2 others contemplated for the very near future. These 35 plants are operated in 25 fields by 28 companies and are processing an aggregate of approximately 2,400,000,000 cubic feet of gas per day, about 68,250 barrels per day of products.

Plants Revamped

Many plants existing at the time of Pearl Harbor have been revamped to increase recovery of the light hydrocarbons and to produce fractionated products needed for the war effort and 3 new plants have been completed and placed in operation. The Katy plant is being doubled in capacity and the Old Ocean plant is being expanded. Two of the new plants dwarf all others in size. The Katy plant will ultimately process approximately 500,000,000 cubic feet of gas per day from wells located on 300,000 unitized acres. The plant will produce about 13,600 barrels of products daily and the plant investment is estimated at about $8,000,000. The Erath plant, now being completed, will produce about 18,000 barrels per day of products. Of the operating plants from the viewpoint of production, Cotton Valley is the largest, producing about 11,000 barrels per day.

During the last six years the gas-cycling industry has grown until at the present time, there is an investment of about $40,000,000 in cycling plants alone. Of the combined total production of natural-gasoline and cycling plants in Louisiana and Texas, 58.5 percent is being obtained from cycling plants. The completion and operation of the Erath plant should increase this proportion to about 60 percent. Thus, cycling operations are of extreme interest to the members of this association.

The estimated gas reserves from which cycling plants are operating in Louisiana and Texas, aggregate about 20,000,000,000 cubic feet out of a total gas reserve estimated at 50,000,000,000 to 75,000,000,000 cubic feet. Although there are 47 classified gas-condensate fields in Louisiana and 92 in Texas, or a total of 139 such fields, cycling operations are conducted in only 24. Plants are being built in 3 fields and are being planned for 6 or 7 more. It is estimated that by the end of 1944, approximately 95,000 barrels per day will be produced from cycling plants now operating or under construction. On the basis of the known reserves of other fields and other governing factors, it is unlikely that other plants will be constructed until new fields are discovered or existing fields enlarged. This conclusion is stated, of course, after giving credit to the 6 or 7 plants now under consideration. It is seen, therefore, that the industry is nearing full development in the light of present known reserves of gas-condensate.

The 25 fields employing cycling operations aggregate about 167,000 acres and contain some 850 gas wells. There is an average of 1 well to each 200 acres and each well produces an average of 80 barrels of products per day. The average plant investment per barrel of products recovered per day is $550 and $16,000 per million cubic feet of daily throughput. It should be remembered that these are average figures in which costs of prewar plants are included.

Economics of Cycling

So much for present development. Now let us examine the general economics of cycling operations.

Cycling is an economic expedient whereby the lease owner may obtain a financial return in a comparatively few years that would under some circumstances otherwise be spread over a very long period. In the case of the lapse of leases, this return could not be realized at all. This comparatively fast return may be realized within the scope of conservation operations. If an average reservoir of gas having a content of 1 to 1½ gallons per thousand or 24 to 35 barrels per million cubic feet of butane and heavier hydrocarbons, had a sufficient gas market for its production, over a reasonable time, and if the gas were produced through a modern gasoline plant, there would be no necessity for a cycling operation in that particular field. One of the great advantages of cycling is that unitization of the field is facilitated and all of the many advantages of unitization are obtained.

In "Rim Oil Fields"

One of the most practical and best uses of the cycling operation is in connection with the production of the so-called "rim oil field," that is, in a reservoir having an extensive gas cap with a comparatively minor accumulation of oil. In such a field, the gas cap cannot be produced without loss or reservoir energy. The continued production of oil will result in higher and higher gas-oil ratios. If this production practice continues to ultimate reservoir depletion, considerable hydrocarbons will be lost by retrograde condensation and gas will be wasted. If a market for gas is available it is normally impossible to expand the gas market at the same rate as gas-oil ratios increase. In such fields cycling may be a solution and a conservation measure resulting in increased production and revenues. Cycling will recover the liquefiable hydrocarbons from the gas in the gas cap without substantially reducing the reservoir pressure. Cycling operations are particularly desirable in the event such fields have inadequate water drive. Operation may well start as pressure maintenance but as gas-oil ratios ultimately increase, effective gas cycling will finally result. Continental Oil Company's Tepetate operation is an excellent example.

One economic bugaboo to cycling operations is the possibility of proration. Since there seems little likelihood that a sufficient gas market will be developed within the next 10 years to provide an economic outlet for all the gas-condensate fields now proven, let alone those to be proven, it is indicated that new discoveries will cause cycling operations to continue to grow in importance. It is only natural that pressure will be brought from refiners and crude oil producers toward the proration of cycling operations. Such proration was unsuccessfully advocated before the Texas Legislature in 1939.

There seems no necessity for proration of cycling plants since the present total production is only 3 percent of the volume produced in the same area and probably will not increase above 5 percent. It can soundly be argued that if

* This paper presented at the annual meeting of the Natural Gasoline Association of America in Dallas, April 12, 13 and 14, 1944.

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cycling plants are prorated, refiners should also be prorated and that proration of cycling operations would be detrimental to good conservation. However, let us suppose that the production from cycling plants should substantially increase and some sort of proration be put into effect. Then on what basis could such proration reasonably be made? On an average-production-per-well basis or on an acre basis, cycling plants are not producing as many barrels per day as comparable crude oil wells. Therefore, if proration were instituted, cycling opreations should be little affected.

The first cycling plants produced raw unfinished products which were marketed to refiners. It happened, at the same time, that such products were undesirable to refiners and hence did not command high prices. Plant operators found that they could manufacture finished products and that the additional investment and operating expense necessary for the manufacture of these products were justified by the increase in market value. This was the start of the general trend of cycling plants to produce finished products. Because of the war almost all cycling plants have been revamped to permit the manufacture of a variety of products.

Normal Advantages

In producing finished products, a cycling plant has several advantages over a refinery. A complete operation from raw material to finished product exists at one place without the necessity of transportation of the raw product. It takes considerably less manpower to operate a gas-condensate field than it does an oil field, and for this reason among others, the operating expense is considerably less. Less personnel is required per barrel of capacity in a cycling plant than in a refinery, hence, operating expenses are less for the cycling plant. The quantity of steel used in gas-condensate fields, oil fields, cycling plant and refineries is a direct measure of the investment. Recent studies indicate that only 28 percent as much steel is required in the average gas-condensate field as is required in the average good oil field. Less steel is also required per unit of production in a cycling plant than in a refinery. Therefore, the investment and operating expenses per unit of production favor cycling operations as compared with oil production and subsequent refining.

Cycling plants are also in a better position to cut back on production in times of adverse market conditions than are refineries. Cycling plants should, therefore, be able to compete with refineries in marketing finished products and it seems that cycling plants will be permanently in the business of producing and marketing these products. At the present time a cycling plant operator will receive from 40 to 60 percent more revenue from finished products than from raw products. From the standpoint of basic economics the refinery can not pay a price for raw materials produced in a gas-condensate field that will preclude the manufacture of finished products in a modern cycling plant.

Marketing presents the major difficulty of cycling plants in producing finished products. The natural characteristics of the material handled by a cycling plant results in a large production of some grade of gasoline and the local gasoline market is rarely able to absorb the production. Since the volume produced seldom will justify pipe lines and water transportation is not often available, the cycling-plant operator is dependent upon tank-car and tank-truck transportation. In transportation, the refiner generally has an advantage, but the basic economic factors indicate that cycling plant operators will continue to produce finished products and will find means of competing or cooperating with refiners.

Aviation Gasoline Source

There are many interesting new developments which can materially affect the future economics of cycling operation. For example, the raw material needed for the production of the new super-fuel 2,3-dimethylbutane are naturally available in cycling plants. An ethane-propane mixture can be cracked to ethyline, alkylated with natural isobutane to produce 2,3-dimethylbutane. The resulting production of 2,3-dimethylbutane can be combined with the gasoline fraction to produce 100-octane gasoline with the result that substantially all of the production from the cycling operations would end in one finished product — 100-octane gasoline. For such an operation, either large fields having large plants or a combination of fields and plants in one area is required. The investment is high, being of the order of $1400 per daily barrel of 2,3-dimethylbutane. But present prices and economics are sound and such plants have been advocated and one may soon be built.

Postwar Prospects

Postwar prospects and planning are currently the subject of thorough discussion, so let us briefly visualize postwar prospects for cycling plants. It has been shown that cycling plants will continue to be built with further discovery of suitable reserves and that such plants will, for natural economic reasons, make finished products of which gasoline is by far the most important. Therefore, the postwar prospects of cycling plants are directly related to such prospects for gasoline. Probably there will be a temporary lull in gasoline consumption immediately following the war but automobile manufacturers are planning and predicting the greatest automobile production in history. Huge estimates have been stated as to the number and use of domestic airplanes which may result from the training of thonsands of expert pilots who may be supplied with airplanes of reasonable cost from the over-expanded manufacturing facilities. The tendency toward higher compression ratios requiring higher-octane gasoline will substantially be increased by the demand for better performance. The increased performance of 100-octane gasoline over 80-octane normally used in a Douglas twin-engine transport is illustrative. Its take-off run with 100-octane gasoline is reduced by 16 percent; its cruising speed increased 8 percent; its ceiling raised 27 percent. Since cycling plants can readily produce high-octane gasoline, there are bright future prospects for this market.

Selective Plugging

■ CONTINUED FROM PAGE 36

off and (2) that the delicate balance of the chemical mixture used is easily upset by traces of material, in the well and the sand and even by the presence of water. This method probably cannot be used for selective plugging except in special cases.

If it is desired to plug off some formation containing large amounts of connate water and very little oil before flooding begins any reagents which will react with materials in the brine will function efficiently. Such reagents may be soap, sodium carbonate (soda ash), sodium phosphate and others. Again, the well should be flushed out with fresh water before injecting the reagent. This method has the disadvantage that the presence of brines in any strata other than the one which should be plugged will produce some unwanted plugging in them as well. However, it is believed that this technique may have a limited application for plugging barren sands containing brines.

There is a group of chemicals which will react with water to give a precipitate by a process known as hydrolysis. This process can be used to plug off water bearing strata (either fresh or brine) but has the disadvantage that any water in the well bore itself will produce a precipitate. Some of the chemicals which have been used are silicon tetrachloride, ethyl silicate, and antimony trichloride.

Since this method requires that there be no water in the well for an efficient plugging its application would be limited, especially in water flooding operations.

This class of plugging reagents requires that some water insoluble material be dissolved in some solvent which is missible with water. When such a solution is mixed with water a precipitate is formed which will act as a plug. An example is an alcohol solution of rosin. This plugging solution is most effective in water-bearing strata and the presence of water in the well is detrimental.

A method which cannot b classified as selective plugging in the strictest sense of the word, has been suggested by some oil men, for a solution of the problem of a heterogeneous permeability profile in the well. It is actually a combination of complete sealing and corrective shooting. It is proposed to use this technique in cases where there is a completely barren streak in the sand which should not be exposed in the well. The idea is to plug all of the formations after the well has been drilled in and then shoot only those formations which are to be produced. This leaves the others sealed off providing shot fissures have not come from above and below the sealed formation and opened it up. This is the biggest possible difficulty with the method. It could be used on both the input and producing wells.

The discussion so far has been confined chiefly to injection wells but it should not be supposed that selective plugging is or must be confined to them. While the treatment of producing wells involves more difficulties with less chance for success than an input well, it should not be ruled out. The treatment of producing wells will be discussed in Part 2.

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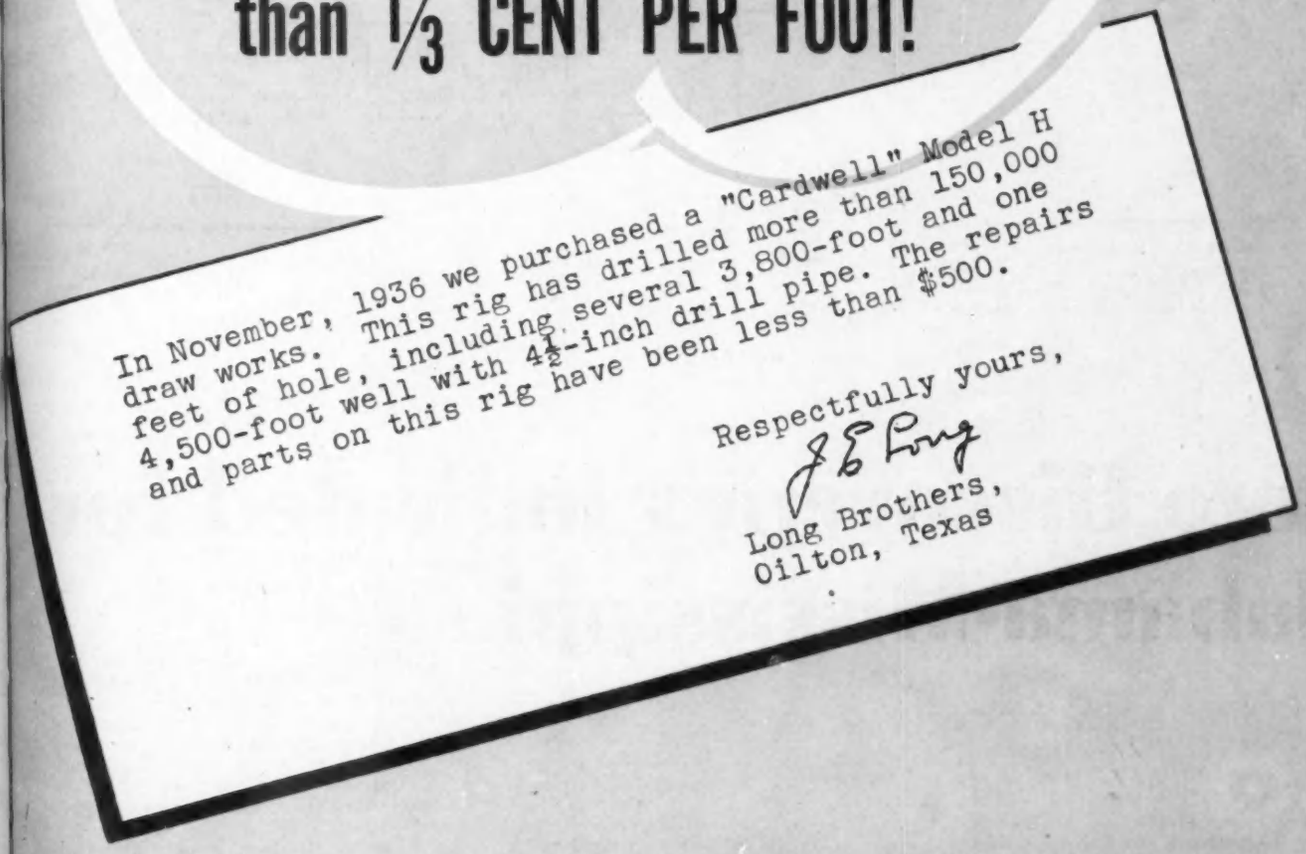
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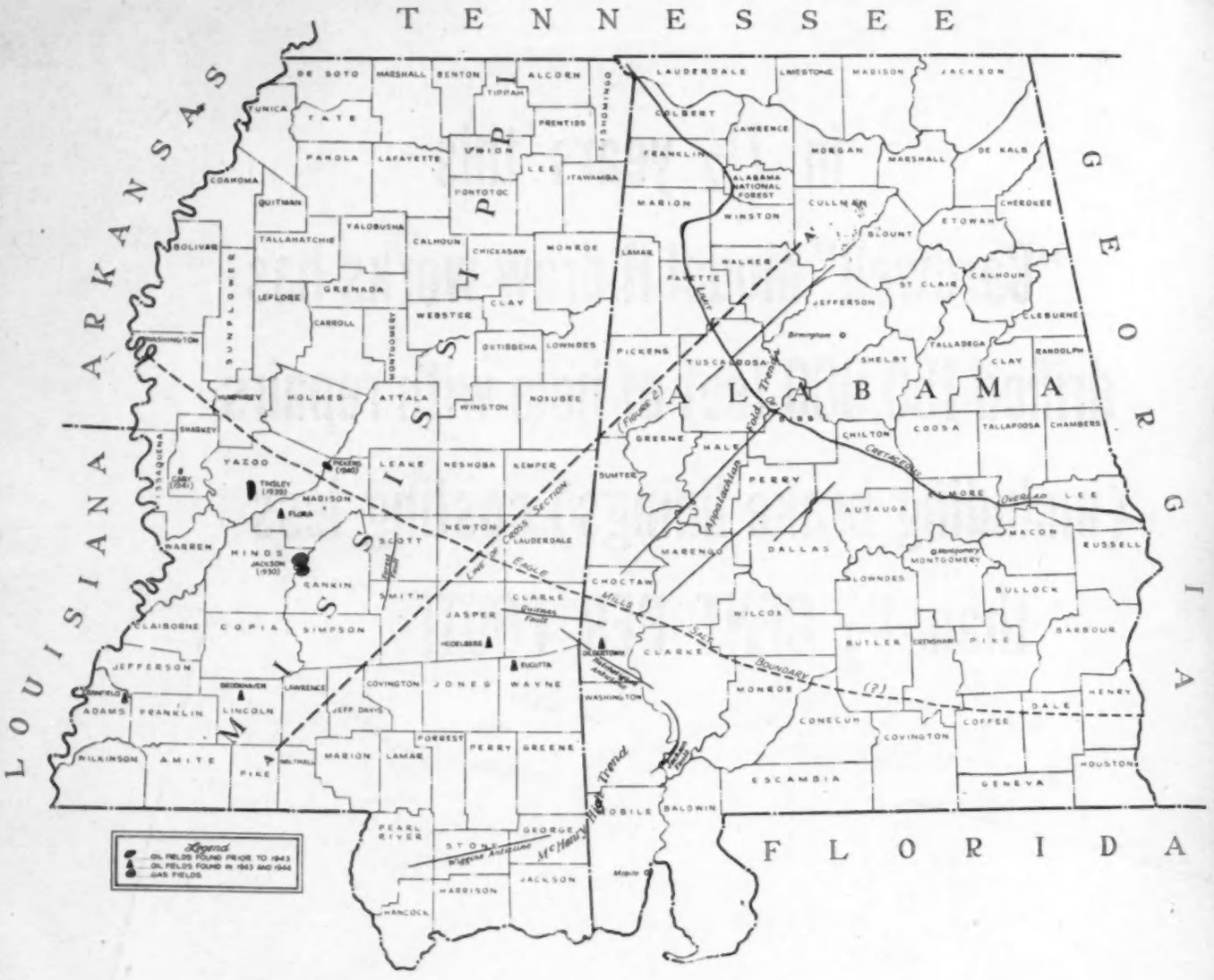

More Discoveries Indicated for Alabama-Mississippi

By DON L. CARROLL, Staff Writer

THE first commercial oil discovery in Alabama, in February, following closely after an important strike in Southeastern Mississippi, has supplied a discovery impetus that was needed to justify the active exploration interest that has been centered on this area in recent months, especially since the opening of the Eucutta field last August.

The Alabama discovery, opening Gilbertown field, was drilled in Choctaw County, nine miles east of the Mississippi border and 40 miles east of the new Heidelberg field in Jasper County, Mississippi. The Gilbertown discovery produces from Selma chalk at 2800 feet, plugged back from 5380 feet after penetrating Tuscaloosa beds. The latter is productive in the nearby Eucutta field, as well as in the Tinsley and Brookhaven fields of Mississippi. Selma is productive in the Tinsley, Cary and Flora fields of Mississippi. Other known producing sands of the region are: Eutaw, yielding oil at Tinsley, Pickens and Heidelberg, (and potentially productive at Eucutta field) and Wilcox, which is the producing sand at Cranfield, 10 miles east of Natchez.

Oil discoveries in Mississippi and Alabama heretofore have been limited to occurrences in strata within the Gulf series, of Upper Cretaceous age, except for the single Eocene Wilcox discovery at Cranfield, near the Louisiana boundary. Likewise, the Gas Rock of the Jackson field is of Navarro (upper Selma) age.

The discoveries at Cranfield and Heidelberg are of major rank, meaning that they may be in the hundred-million-barrel class. Further drilling at Eucutta may show that field to be of similar importance. Between these two localities, across the width of Mississippi, lies an area that is now getting concentrated exploratory attention — an area that holds promise of containing many major fields.

Until recently geologists assumed the base of the Tuscaloosa beds rested on the eroded and downwarped surface of truncated Paleozoic rocks that plunge under the Gulf Coast and Mississippi Embayment sediments and that these upper Cretaceous and younger sedi-

The Map

Mississippi-Alabama index map showing oil and gas fields, line of cross-section and assumed sub-surface extent of Eagle Mills (Jurassic) salt bed, based on study of recent data.

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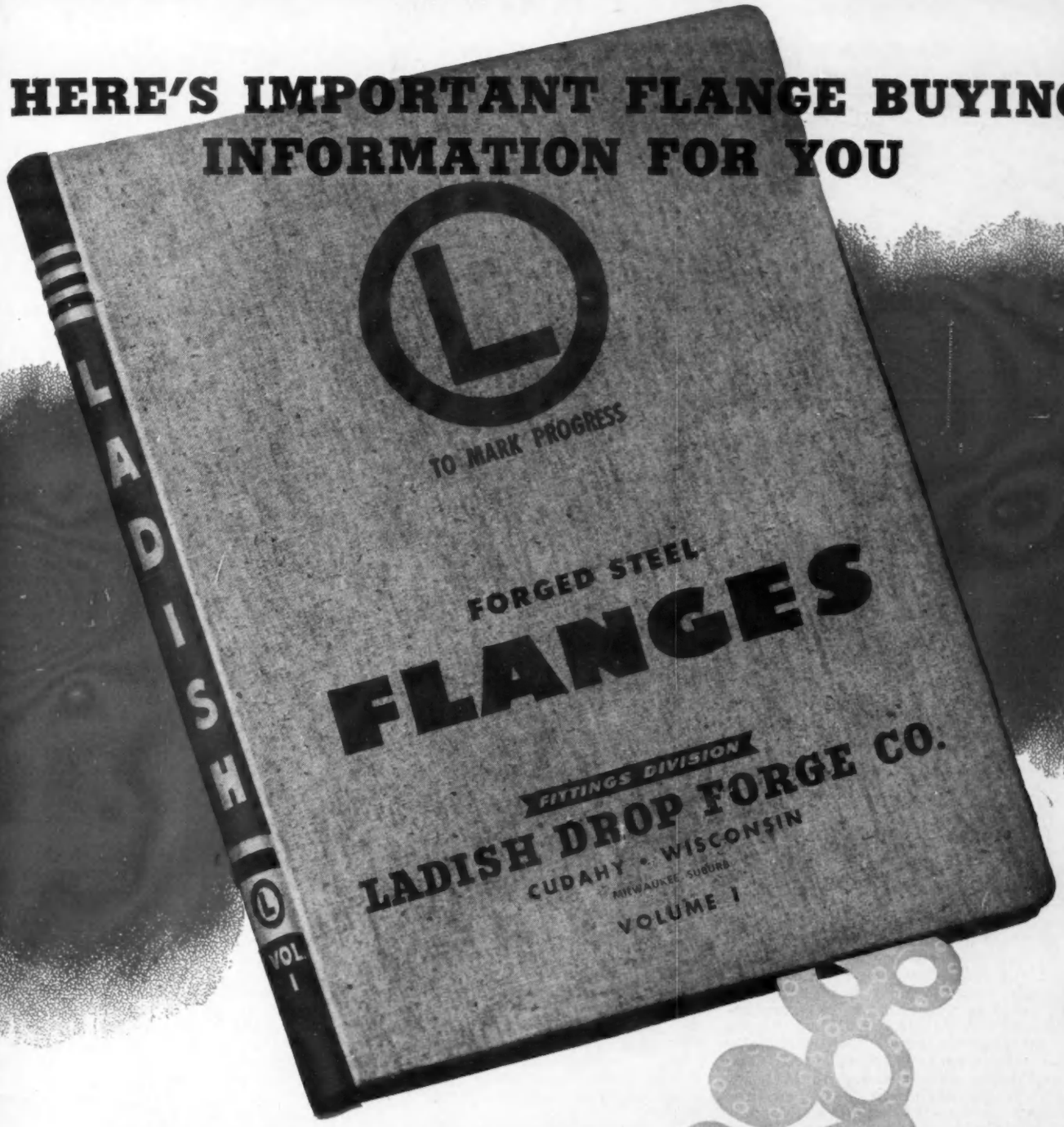

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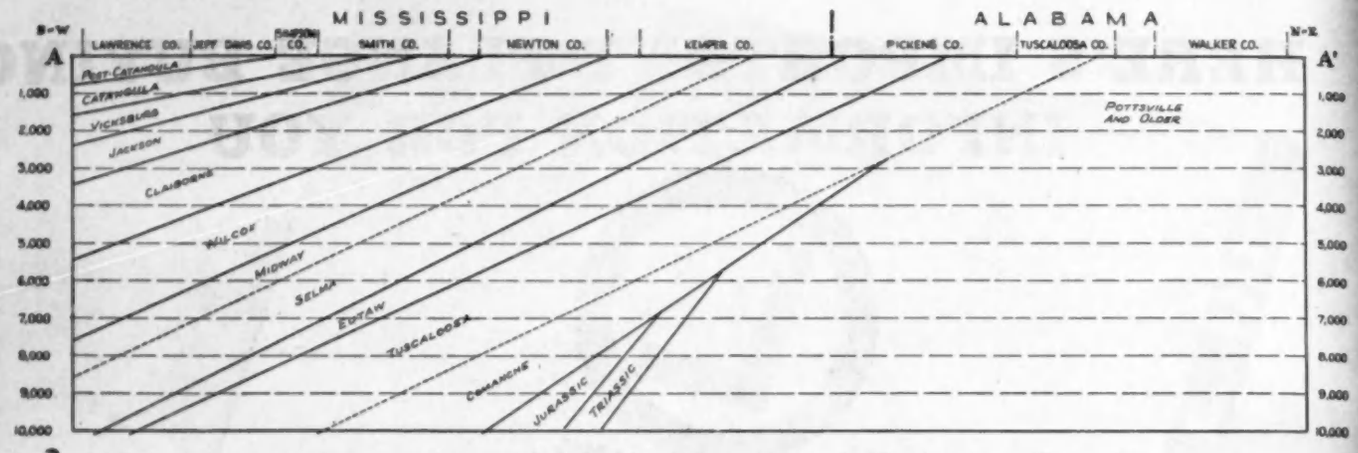

Hypothetical cross-section from Cullman County, Alabama, to Pike County, Mississippi, with postulated depths and local stratigraphic sequences. Progressive downward dip is exaggerated.

ments overlapped each other progressively northward and northeastward, but that the regional unconformity represented a hiatus from the Pennsylvanian rocks up to the base of the Tuscaloosa. Special Report 15, of the Geological Survey of Alabama (1929) says: "The existence in Alabama of Lower Cretaceous formations has long been postulated, and the presence of such formations has in several cases been reported; but in every case, later investigations have disproved their existence. The possible occurrence of Lower Cretaceous, Jurassic and Triassic sediments under the Coastal Plain of Alabama is of great significance to the oil prospector. . . . The field evidence, however, is distinctly against the existence of any of these formations. . . . At the present time, therefore, no strata assignable to the Lower Cretaceous are known. . . . From the Mississippi River to Virginia no representatives of the Lower Cretaceous have yet been recognized, either at the outcrop or in deep wells."

L. W. Stephenson, in his chapter on the Mesozoic rocks, in "Geology of Alabama" (1926), writes, "Rocks of late Pennsylvanian, Permian, Triassic, Jurassic, and Lower Cretaceous ages are entirely absent in Alabama, and Upper Cretaceous sediments rest directly upon much older rocks which range in age from Middle Pennsylvanian to Archean. . . . At the beginning of Upper Cretaceous sediments rest directly upon much older rocks which range in age from Middle Pennsylvanian to Archean. . . . At the beginning of Upper Cretaceous time the southern part of the State began to sink and the ocean waters encroached northward. . . . Sediments were washed into this sea by the streams that flowed from the land area to the north, and gradually the sands, clays and chalks composing the Upper Cretaceous formations were accumulated.

We now know that such opinions were erroneous, and that the sedimentary section in this great basin is not only thicker than previously supposed and asserted, but that it comprises strata extending well down into the Jurassic. Evidence for these altered opinions has come to light only since the discovery of the Jackson gas field, in 1930. Since that time, deep test wells have been put down at several localities in Mississippi and Alabama, penetrating not only Lower Cretaceous or "Comanche" beds, but strata as old as and equivalent to the Eagle Mills formation below the Smackover horizon.

One deep test on the north flank of Jackson Dome, drilled to 5200 feet, encountered 2700 feet of Cotton Valley strata immediately below the Gas Rock. Because of the steep dip of the formation on the dome flank this apparent thickness of the Cotton Valley represents a great exaggeration, but since the hole did not penetrate to underlying rock (presumably Buckner or Smackover) it seems reasonable to assume that the Cotton Valley is at least several hundred feet thick in Southwestern Mississippi.

In 1941, another test was drilled to 12,399 feet in Clarke County, Alabama, near the east end of the Hatchetigbee anticline. It was drilled through the Smackover horizon, and on into the underlying Eagle Mills, thus proving the existence in the basin of pre-Comanche strata. Moreover, the Eagle Mills was found to be composed of interbedded shales and salt, thus suggesting that this horizon is probably the source of the salt in the salt domes that are known to be present within the same basin, at least as far north as Yazoo County in Mississippi. This belief is further strengthened by the fact that geophysical surveys of the Hatchetigbe area indicate that the core of the anticline is a deeply buried salt ridge, with two salt domes rising from it. Other sediments therefore can be assumed to exist even below the Eagle Mills in that locality. The Eagle Mills salt bed is probably as much as 20,000 feet below the surface in extreme Southwestern Mississippi.

The areal extent of the Eagle Mills salt bed in Mississippi and Alabama can not be established from the meager data so far brought to light, but the wide distribution of salt domes in the region indicates that this member and associated Jurassic formations continue across from Arkansas and North Louisiana, having a northern boundary roughly parallelling the surface outcrop line of the Yegua formation, south of which line the basin deepens rapidly, as shown by the southward thickening of the Claiborne series.

A well drilled in Lauderdale County, Mississippi, reached Paleozoic rocks at 6060 feet without finding a Jurassic section. This means either that the edge of the salt basin lies south of that point or that a high Paleozoic ridge is present there, with the Jurassic beds surrounding its lower flanks. The former seems more likely.

Several salt domes exist in the area surrounding the Jackson uplift, indicating that the Eagle Mills is present below and is continuous northwestward into Arkansas. The Tinsley structure is regarded as a large salt-dome uplift, which, incidentally, may have been initiated in Selma time by an igneous intrusion of lesser degree than that which forms Jackson Dome. This possibility is suggested by study of the cross-section by McClothlin, published with his paper on the "General Geology of Mississippi," in the January 1944, issue of the Bulletin of the A. A. P. G.

Existence of Lower Cretaceous Comanche strata in Mississippi and Alabama has been conclusively demonstrated by well cuttings and cores. They comprise beds in the Travis Peak and

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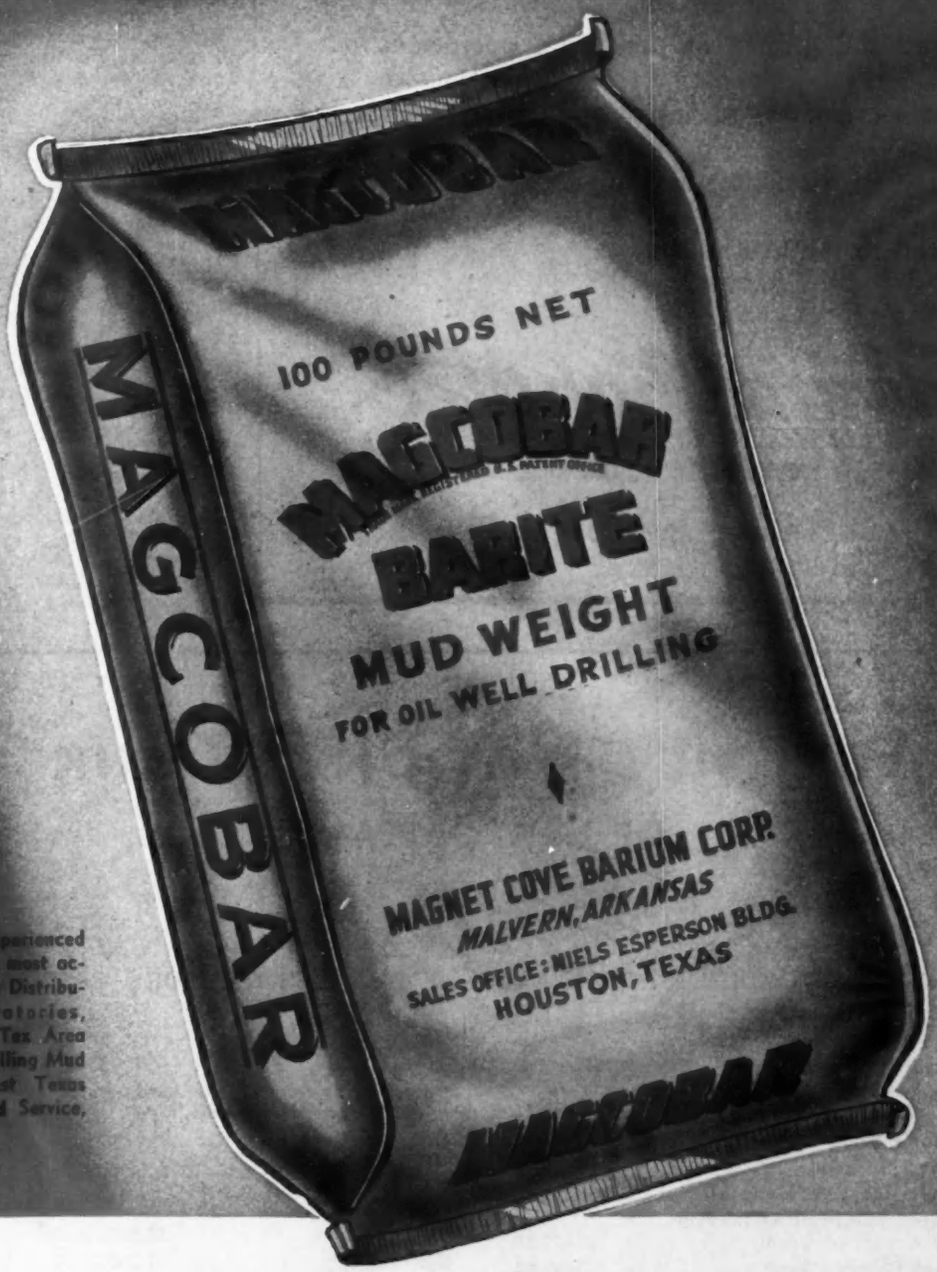

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Trinity proper. Furthermore, the upper part of the Travis Peak carries the massive anhydrite bed that is regarded as being normally associated with this formation. This is another indication that Mesozoic sedimentation was continuous across the present Mississippi Valley area and across Southern Alabama.

The Paleozoic surface which underlies the basin area of Mississippi and Alabama, north of the McHenry high area, slopes downward to the southwest in Mississippi and almost south in Alabama. The rate of sloping increases to a marked degree where the Claiborne group is added to the sedimentary section, and continues down to unknown depths towards the low point of the salt basin proper. At a number of points the slope is interrupted by fault displacements, anticlines, salt domes and ridges, igneous intrusive bodies that have uplifted the Mesozoic rocks.

Among the most prominent of these interrupting structures are the Jackson and Tinsley domes, the Hatchetigbee, Lower Peach Tree, and Wiggins anticlines, the Sharkey uplift, the Quitman, Jackson and Forest faults, and several broad arches in the strata deposited above the ancient Appalachian folds in Alabama, where they plunge under the embayment sediments. The Sharkey uplift may be considered as a local expression, with igneous intrusions, of the Monroe anticline, which crosses the Mississippi Valley in a northeastward direction from the Sabine uplift area.

The existence of linear anticlinal structures in the Mesozoic strata of Alabama, below the Upper Cretaceous, and marking the subsurface continuation of Appalachian folds, is an assumption on the part of the writer that is offered as

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U. S. Government Obligations, Direct and Fully Guaranteed	143,257,658.14	Acceptances Account of Customers and Letters of Credit		925,618.23
State, County and Other Public Bonds	13,872,415.56	Dividend Declared, Payable July 1, 1944		84,000.00
Other Bonds and Securities	1,015,779.21	Accrued Interest, Expenses and Reserves		383,730.80
Loans, Discounts and Acceptances	42,033,168.12	Capital	$2,800,000.00	
Customers' Liability Account of Acceptances and Letters of Credit	555,477.99	Surplus	7,200,000.00	
Stock of Federal Reserve Bank	300,000.00	Undivided Profits	2,876,033.65	12,876,033.65
Accrued Income Receivable and Prepaid Expenses	631,671.61			
Banking House, Furniture and Fixtures	3,043,444.67			
Branch Banking Houses	754,414.43			
Other Real Estate	307,761.16			
TOTAL	$277,216,807.28	TOTAL		$277,216,807.28

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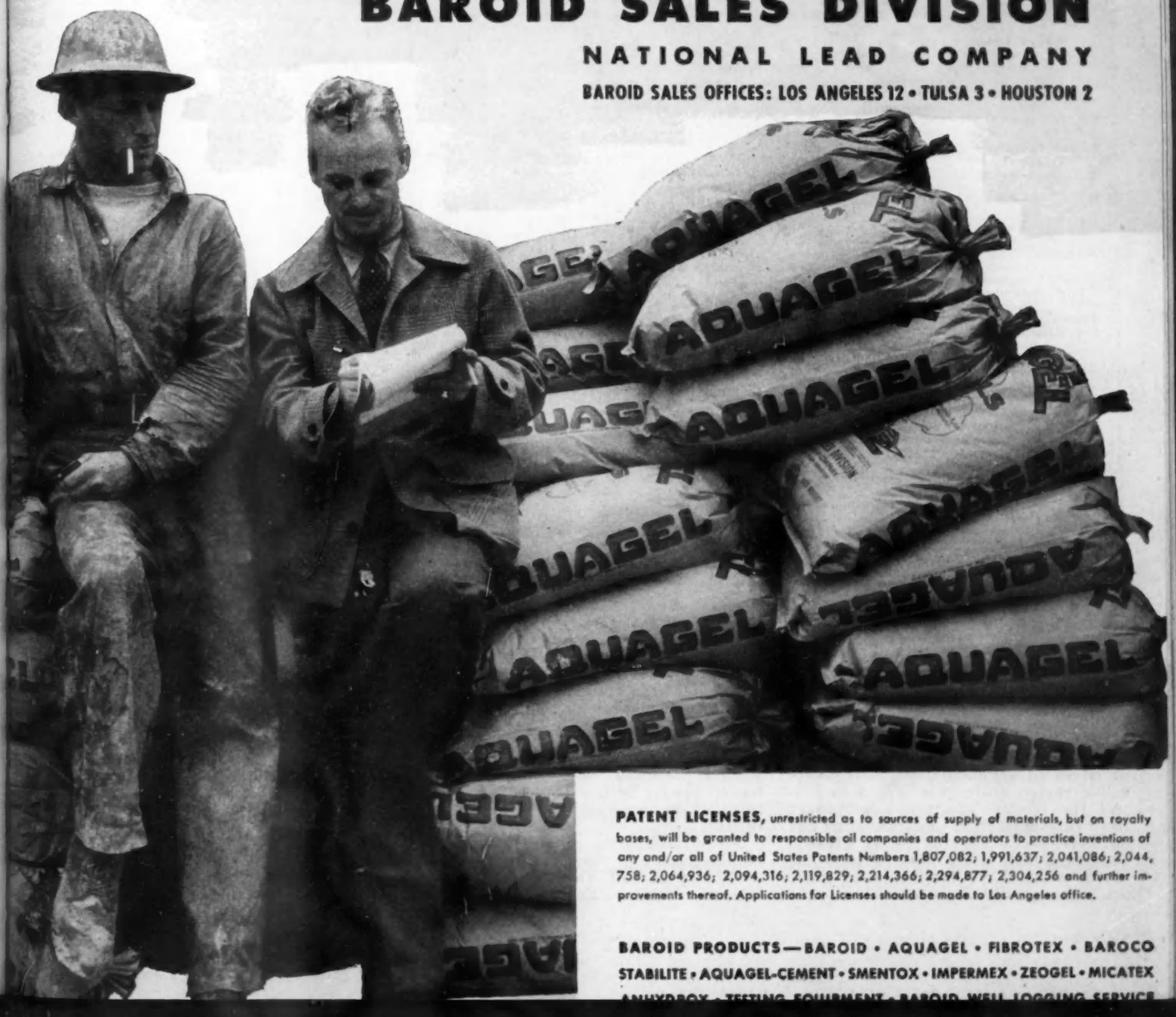

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Proposed Stratigraphic Outline for Mississippi-Alabama Basin

Pleistocene and Recent
- Citronelle and younger

Pliocene
- Pascagoula clays and sands

Miocene
- Hattiesburg clays
- Catahoula sandstone
- Upper Chickasawhay beds (including Bucatunna)

Oligocene
- **Vicksburg Group**
  - Lower Chickasawhay beds (or Byram)
  - Glendon Limestone
  - Marianna "Chimney Rock"
  - Forest Hill sandstone and clay
  - Red Bluff glauconitic beds

Eocene
- **Jackson Group**
  - Yazoo Clay (including Ocala Limestone)
  - Moody's Branch green sand (includes upper Gosport)
- **Claiborne Group**
  - Lower Gosport
  - Cockfield-Yegua
  - Wautubee-Lisbon glauconitic beds
  - Kosciusko sand
  - Ziipha carbonaceous clays
  - Winona red, glauconitic sands
  - Tallahatta claystone and sand (includes Grenada)
  - Meridian micaceous sand
- **Wilcox Group**
  - Locally variable series of sands, clays, marls, lignitic beds, and calcareous sands, that can not be subdivided for correlation purposes. Includes so-called Hatchetigbee, Bashi, Wood's Bluff, Tuscahoma, Holly Springs, Ackerman and Nanafalia formations.
- **Midway Group**
  - Porters Creek clays and shales (with Sucarnochee clay)
  - Clayton limestone, marl and sands

Upper Cretaceous (Gulf Series)
- **Selma Group**
  - Navarro-Selma limestone and chalk (includes Jackson Gas Rock, Prairie Bluff and Ripley formations)
  - Taylor-Selma gray shale, with sandy chalk, micaceous, calcareous and glauconitic zones
- **Eutaw Group**
  - Upper Eutaw sands and shales
  - Lower Eutaw shales and sands, with siderite, ankerita, glauconite and water-laid volcanic beds
- **Tuscaloosa Formation**
  - Upper Tuscaloosa sands, clays, gravels and lignites, and some shales
  - Lower Tuscaloosa—gravel at base, below "Massive Sand," so-called "Marine Section" above Massive Sand; overlain by interbedded sands and shales

Lower Cretaceous (Comanche Series)
- **Trinity Group**
  - Fredericksburg Limestone (restricted to deeper area)
  - Paluxy red shales and sandstones
  - Upper Glen Rose red and gray shales and sandstones
  - Massive Anhydrite
  - Lower Glen Rose red and gray shales and sandstones
  - Travis Peak red shales, sandstones and conglomerates

Jurassic
- Cotton Valley red and gray shales and sandstones
- Buckner anhydrite
- Smackover Limestone
- Eagle Mills interbedded salt and shales (May be Permian)

Triassic (may not be present) basal gravels on Pre-Mesozoic surface (May be lower Permian)

Pre-Mesozoic
- Lower Pennsylvanian black shales and slates, and hard sandstones
- Upper Mississippian (Chester) sandstones, limestones and shales
- Lower Mississippian rocks
  - St. Genvieve Limetone
  - Tuscumbia Limestone
  - Ft. Payne Chert ("Lauderdale')
- Devonian rocks
  - Chattanooga Shale
  - Frog Mountain Sandstone and equivalents
- Silurian rocks
  - Red Mountain Sandstone and Limestone (Clinton ore rock)
- Ordovician rocks
  - Chickamauga Limestone and associated beds
- Cambrian rocks
  - (presence doubtful)

Pre-Cambrian
- Algonkian and Archean crystallines

a suggestion meriting exploratory attention. The ridges actualy do plunge under mantling sediments. How far they extend under the mantle can only be conjectured, but assuming that the buried ridges are present, several possibilities suggest themselves.

It is obvious that downwarping of the area during the Mesozoic and the initiation of sedimentation in the subsiding region must have served to protect the affected parts of the ranges from further erosion. At least, they can not have been lowered to as great a degree as their component parts to the north, which have been exposed since the close of the Paleozoic. Pinch-outs of Jurassic and perhaps younger strata therefore can be expected to exist along the flanks of the buried ridges. Even after complete burial under originally horizontal beds compaction of the sediments and differential settling can be assumed to have been effective in producing arching of the strata above. Therefore, it is suggested that the subsurface positions and directions of the buried ranges be interpolated as guides to petroleum explorations in South Alabama.

All but one or two of the oil fields so far discovered in the area are definitely known to be salt-dome accumulations, and all of them may really be of this type. About 15 other salt domes are known to occur there, and geophysical investigations have pointed out the probable locations of many more. Even so, very little drilling has been done on them except at crest locations. For all practical purposes only the cap-rocks have been explored. Tests put down in search of flank production have been so few in number that this field of endeavor remains wide open.

Recent Mississippi discoveries have led to revision of geophysical interpretations regarding the area. Re-checking has revealed that the supposed Selma reflecting surface, upon which previous seismic interpretations were based, is actually Midway, and that the great thickness of Selma limestone rather effectively prevents shooting on lower beds. As a result, gravity surveys are now being given preference by several companies, especially for the locating of salt domes. Acquisition of most of the lease blocks in South Mississippi has been based on gravity mapping. Magnetic surveys have been found to be effective in picking up structure controled by igneous intrusions, such as those of Jackson Dome and the Sharkey platform area.

Upper Cretaceous Overlap

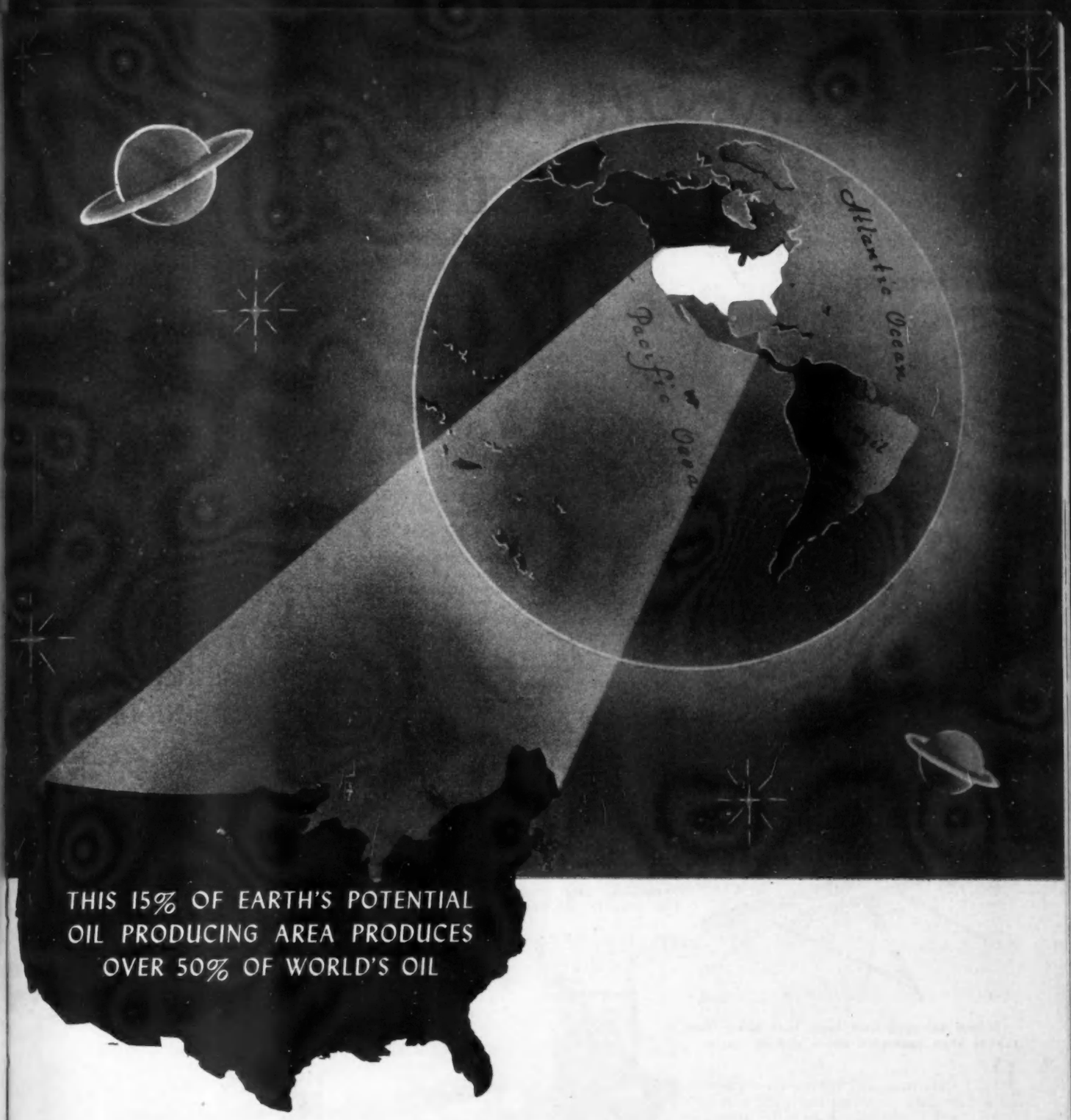
Since it is now definitely known that Lower Cretaceous (Comanche) and Jurassic rocks are present in considerable thickness under much of the basin area of Mississippi and Alabama, it is evident that they are either disconformable under the more widely distributed Upper Cretaceous, or that they wedge out and are overlapped by these higher beds. The belt of truncation or overlap thus represents favorable prospecting territory of the highest order from the standpoint of possible discoveries of stratigraphic trap oil between the boundaries of this belt.

Area Getting Exploration Play

Drilling ventures are becoming increasingly numerous in South Mississippi and on both sides of the common boundary between the two states. A second completion in the Heidelberg field, Jasper County, indicates that this newest Mississippi field will be of major proportions, and will cover some 7000 acres. The second well is reported to have confirmed closure on the structure amounting to as much as 700 feet. A third well is at an advanced stage of drilling, and a number of companies have made additional locations in the vicinity.

Both Eucutta and Heidelberg have yielded oil of low gravities from Eutaw and massive Tuscaloosa sands. The same situation prevails with respect to the discovery at Gilbertown, in Alabama, where the Selma chalk is the pay. The oil so far found in these three fields ranges 17 and 24 gravity. Much better grades of oil have been found in the other fields of Mississippi.

An exploration and drilling campaign is underway in the two states on such a scale as to represent a conclusive appraisal of the future possibilities of the region in general. The geology is favorable, from the standpoints of both structure and stratigraphic section, and even at this early stage there is ample justification for believing that the Gulf Coast petroleum belt extends across these states, without interruption, to the Atlantic Coastal Plains area.



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General
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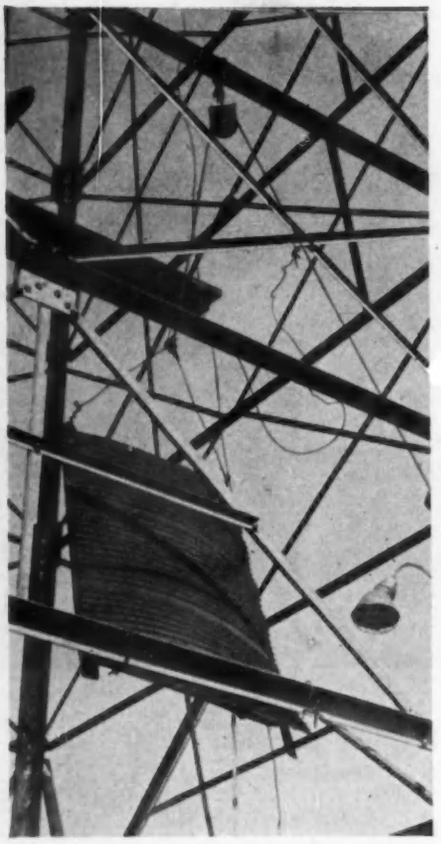
PRACTICAL OPERATING *Hints* FOR THE PRODUCTION MAN

$5.00 will be paid for each illustrated acceptable contribution. Mail to The Editor, THE OIL WEEKLY, Houston

1. *SERVICING*

Adjustable Shelter Betters Operating



Section salvaged from lease tank forms floor shelter when suspended above working space.

PULLING rods and tubing on a rainy or windy day, or wrestling with a difficult "wet" pulling job usually means that the crew will be subjected to a rain of water and oil spray as the stands are drawn up in the derrick. The hoist operator, while subjected to the spray as much as the floor men, has it doubly hard, since he has to look continually upward, following the course of the travelling block and elevators. To lessen his discomforts somewhat, yet not impair working efficiency, an inexpensive "awning" type of cover may be installed in the derrick immediately over the point where the drawworks operator and the controls are spotted on the derrick floor.

Instead of junking small gauge tanks when their bottoms or sides are rusted or corroded so as to make them otherwise useless, they may be cut into sections, braced and reinforced with light timber, and hung in the derrick. Supported in hinge fashion, the tank section is swung from the lowermost girt, while a line connected to the other end and passed over a pulley in the third girt up, provides a means of raising and lowering it from ground level as occasion demands. The section is mounted so that, when it is in a near-horizontal position, the original curve of the tank side will permit drainage off the sides. This domed construction is much more desirable than the practice of using a smooth un-arched section of tin or wood, where, unless the shelter is perfectly level, oil or water is more likely to drain to the rear on the drawworks or to the front and down to the floor around the casing head where the men are working.

Given a heavy coating of asphaltic crude oil or an application of rust-resisting black paint, the salvaged tank sections will provide years of service. If care is taken in salvaging and handling available scrap materials, sufficient shelters of this type for a half-dozen or more wells should be derived from the average-size lease gauge tank.

2. *FIELD PUMPING*

Flexible Tie-Ins Snub Line Vibration

TIE-IN of a field pump to the suction and delivery lines may lead to the transfer of serious stress to pump casing if expansion and contraction changes in line lengths are not provided for. One company, even though the lines are buried to provide maximum temperature control, utilizes short hose connections between steel pipe and pump, although the pumping unit is rigidly mounted on a concrete base. The hose not only absorbs line shift, but also serves to isolate any vibration which may originate in the unit, and thus to prevent possible stress on line joints.

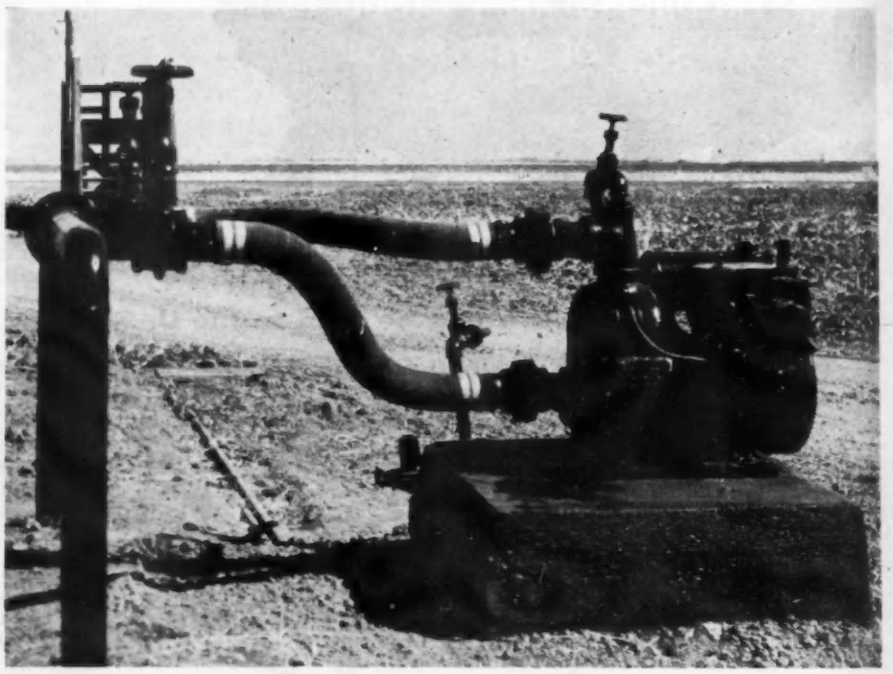
The loop of line, brought up to afford pump connections, is stiffened by carrying the line straight across at the tapping points, connection between the risers being made by a blind flange to prevent recirculation of the fluid. The outlets, tapped into the run on either side of the flange joint, are thus supported much more satisfactorily than would be the case were a bare pipe end brought up on an ell to carry the necessary hole tie-in.

3. *FIRE FIGHTING*

Improvised Equipment Meets Emergenies

READY transportation of fire-fighting equipment frequently marks the difference between extinguishing a small blaze, or futilely fighting a serious conflagration. Particularly with smaller companies or far-flung units of larger organizations, the provision of adequately mobile units is imperative.

In these days of equipment shortages the emergency trailer fitted out on a



By mounting unitized pump on concrete block and permitting suction and discharge risers to adjust expansion shifts unhampered, these hose connections extend unit and line life.

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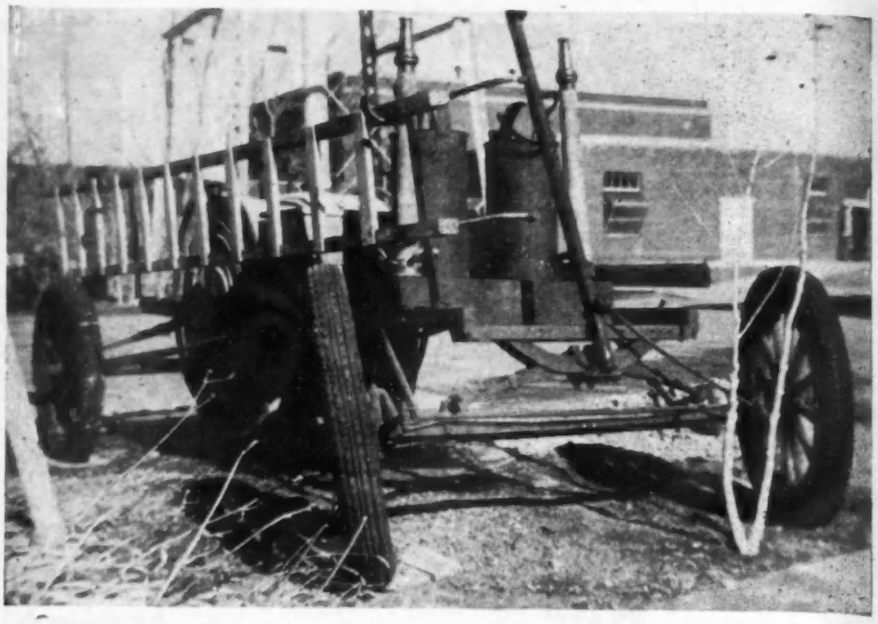

An old Model T chassis, revised to provide steering through tow rod instead of wheel, and with various equipment units mounted atop frame, permits hand or power haulage to point of use.

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THORNHILL-CRAVER COMPANY
HOUSTON

PAGES 3079 THRU 3098
IN THE 1943-44
COMPOSITE CATALOG

stripped automobile chassis by one farm boss is interesting in that it requires no new materials. The chassis of a Model "T" Ford is altered by cutting the rear axle braces free from their usual junction with the propellor shaft housing, taking the braces instead to the side members of the frame. The front "wishbone" or axle brace is also cut and taken to the frame on either side, being pivoted at the new point of attachment so it can yield under road inequalities.

A tongue made from 1½-inch pipe is attached to the U-bolts holding front string to frame, the front wheels being retained in line by attaching the drag link to the tongue at the proper distance to preserve steering sequence. The tie rod, normally behind the axle, is brought in front to permit drag link operation by reversing the spindle, exchanging right and left units without dismounting wheels.

Various ways of mounting the equipment may be used, depending on the use to be made of the truck. This operator has chemical tanks on the front, followed by a tool box and the fire hose on a reel on the rear. A ladder is conveniently placed on hooks on the side of the vehicle. To facilitate unrolling the hose, the nozzles are placed on separate holders. This rig can be pulled by hand to nearby fires by two men, but in case it is needed at a distance a trailer hitch is provided which can be used on any car whether the car has a trailer hitch or not.

4. *PUMPING*

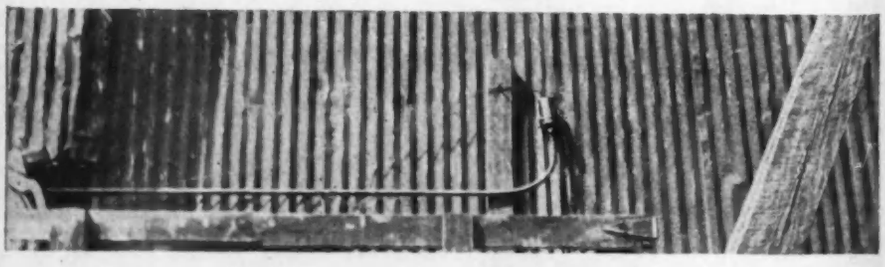
Band Wheel Oil Lead Affords Clearance

WHEN pumping a well with the original band wheel, lubrication of the bearings of the band-wheel shaft is a hazardous job while the unit is operating. By installing a remote filling point, the operator can replenish the bearing supply without exposing himself to the swing of crank or counterweight.

A simple extension consists of a convenient length of ¼-inch pipe, one end bent through 90° so as to rest close to or just within the top of the oil wicking, with the outer end bent up at 180° from the delivery end, a swage nipple or large section being attached at the upswept end to afford convenient receptacle for the spout of the oil can while replenishing the supply. A small tin can, one end cut clear, is upended over the swage between oiling intervals, to prevent the line filling with water.

By giving the ¼-inch line a slight slope toward the bearing, the oil feeds relatively slowly into the wicking, preventing sludging and possible overflow, with consequent wastage.

Extension of the magneto trip line alongside the oiler centralizes control of pumping engine.



By extending a section of small diameter pipe from band-wheel shaft box to point outside the counterbalance circle, oiling may be done during pumping cycle without danger to operator.

Huge Production Gains Seen in Postwar Period

Daily increase of from 1 to 1½ million barrels seen as result particularly of Near East and Venezuela gains; increased world consumption appears the best way for industry to avoid depression, once war ends

IF PRESENT indications are fulfilled, foreign oil production rates within a few years may be anywhere from 1 million to possibly -½ million barrels daily greater than before the war. Largest potential source for additional production is the Near East area, although Venezuela is a more assured source for an immediate gain.

The reserve of the Middle East, or Near East, are exceptionally large, and only a moderate amount of drilling would provide much production. The Middle East Mission of the Petroleum Reserves Corporation has reported that the actual proved reserves of the area amount to 16 billion barrels and that the indicated reserves from fields discovered but not yet fully explored total between 25 and 27 billion barrels. This compares with 20 billion barrels of reserve in the United States.

The report of the Mission warned that "given reasonable time and a very moderate amount of oil field material, any single one of these four groups (Iran, Iraq, Kuwait, or Saudi Arabia-Bahrein-Qatar) can develop and maintain within its own properties sufficient production to supply world requirements from the Middle East area for many years to come. For the next 10 to 15 years at least, the Middle East area is likely to develop and maintain productive capacity of as much as four times its probable market outlets."

Gain in Middle East

If the proposed pipe line from Saudi Arabia and Kuwait to the Mediterranean Sea is built, economics will demand that it be operated at capacity, which would set the production rate of these two countries at 300,000 barrels daily. This would be in contrast with 15,000 barrels per day prior to the war. And regardless of whether the pipe line is built, production of these two countries probably will be developed. The oil fields found to date are near the Persian Gulf, and the west tanker fleet that will exist after the war will provide means of moving production to markets.

If Saudi Arabia and Kuwait produce increased quantities of oil after the war, they will touch off a competitive situation between different companies and between adjacent nations. Iran and Iraq could not be expected to be satisfied with their prewar output of, respectively, 215,000 and 75,000 barrels daily. They would want to continue to enjoy the advantage they have had heretofore, or at least a parity.

If it is assumed that these two countries will seek only a parity with the output of Saudi Arabia and Kuwait, and increase their production to 300,000 barrels daily each, the Near East, with Qatar and Bahrein also considered, may be producing 1 million barrels daily within a few years. This would be about 700,000 barrels per day more than the 300,000 to 325,000 barrels per day the whole region produced prior to the war. With its large reserves the Near East could easily develop even greater producing capacity.

Other Nations To Boost Output

Venezuela is another prospective million barrel per day producer after the war. Early last fall, PAW announced a program for increasing Venezuela's producing capacity to approximately 1 million barrels daily by 1945. Lack of materials and shipping space have retarded the program, but progress is being made. The drilling of 500 wells was expected to boost Venezuela's daily production to a million barrels, and if sufficient materials are not provided during the war, the postwar period is likely to see fulfillment of the plan. Prior to the war, Venezuela was producing 600,000 barrels daily, so the production of a million barrels daily would result in an additional 400,000 barrels from this source.

Because of the vast reconstruction program facing her, Russia probably will be in need of foreign exchange after the war. Oil is one of the minerals that she has in abundance. So Russia might decide to increase her production, and become an exporter, as she did during the 20's when in critical need of foreign exchange.

Prior to the war Russia was consuming her daily production of 625,000 barrels, but the country has vast potential oil-bearing regions from which additional production could be developed. Furthermore, if oil production in neighboring Near East is increased materially, the Soviets may increase their production as a protective measure against a flood from the south. Therefore, while it cannot be forecasted with any accuracy, Russia might bcome the source of another million barrels of oil daily in the postwar period.

In addition, smaller increases in Colombia and Trinidad are included in PAW's program for foreign development. Furthermore, proving of the Norman Wells field as a major producing pool has opened a vast territory in Western Canada that may develop into a source of large production. The Canadian government is encouraging development of the petroleum resources in this region.

If Near East production is boosted to around 1 million barrels daily after the war, the output of the region would approximate the prewar demand of both Europe and Africa. For geographical reasons, especially if the Arabian pipe line is constructed, the Near East would be the logical source for many of the European and African markets.

Postwar Possibilities

This situation could eliminate most of the eastward movement of oil from both the United States and Venezuela, which amounted to 600,000 barrels daily before the war. Then if Venezuelan production is raised 400,000 barrels above prewar rates, and also loses the market for nearly 300,000 barrels that were sent to Europe and Africa in prewar, there could develop a surplus of 700,000 barrels daily in this country. This oil would have to seek a market, and would therefore be in direct competition with United States petroleum.

If the Near East and Venezuela produce a million barrels each, this would represent an increase over prewar output of 1,075,000 barrels per day. Increased production from Colombia, Canada and others could easily add from 50,000 to 100,000 barrels. If the less certain gain in Russian production should also occur, postwar foreign producing rates could be 1½ million barrels per day more than prior to the war.

Production of the United States should drop from its wartime levels to at least prewar rates, and due to the exceptionally heavy drain on its developed sources may dip somewhat lower. But, unless the oil industry of the United States is to be severely depressed, production rates of this country cannot be reduced to make room for 1 or 1½ million barrels additional output that foreign sources may contribute. Consequently, a sufficient gain in consumption to offset the growth in foreign producing rates must be developed to prevent the industry again being beset with excessive production within a relatively short period of time once hostilities cease.

Petroleum Pioneers of California Organize

S. H. Grinnell has been elected president of the Petroleum Production Pioneers Association, organized recently when 150 old-timers gathered at a dinner meeting in Los Angeles. Objective of the association, as outlined in the keynote address of L. B. Little, is to establish a closer bond between the veteran oil men and the younger element to the end that the latter may have the benefit of the old-timers' experience and that the older men may keep in touch with progress. Most of those attending the meeting have had more than 25 years experience in oil production or material supply. Membership is to be limited to 250 of which 80 percent must have 30 years experience. A history of the industry in California, including personal sketches of the pioneers is planned.

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Pipe Line Review

Panhandle Hearing Set For June 7 in Chicago

The Federal Power Commission has switched from Washington to Chicago the hearings scheduled for June 7 on applications of Panhandle Eastern Pipe Line Company for changes in facilities docketed last March. On the following day, also in Chicago, hearing is scheduled on applications filed by the company April 24.

Shell's Wheeler Outlet To Be Completed June 1

Shell Pipe Line Corporation's 10 miles of 6-inch oil line from the Wheeler field, Winkler County to its Monahans-Sealy pump station is scheduled to be completed by June 1. Oil now being delivered to Magnolia Pipe Line Company's line south of the Wheeler field through lines leased from Shell Pipe Line Corporation will be diverted to Monahans station. This gives the gathering system in the Wheeler field a direct outlet to the main line.

Corpus Christi Firm Gets Willamar Line Contract

Pan American Pipe Line Company has awarded contract for construction of 34 miles of 8-inch oil line from the Willamar field, Southwest Texas, to Port Isabel to J. W. France & Company of Corpus Christi. Construction is scheduled to start June 1.

Gathering Arrangement for Drumright Line Completed

Arrangements have been completed for gathering the 65,000 barrels of oil daily necessary for Stanolind Pipe Line Company's 383-mile 16-inch line from the West Texas Permian Basin to Drumright, Oklahoma. This necessitated the rearranging of numerous gathering lines, transfer of many connections and new arrangements with the gathering companies.

Refinery in Venezuela Is Planned by Sinclair

Deliveries of oil in Venezuela to Sinclair Oil Corporation are running in excess of a million barrels monthly, H. F. Sinclair told stockholders at the annual meeting. The company has drilled more than 70 wells there, has three dry holes and is running seven strings of tools. Sinclair reported the company is increasing its pipe-line capacity in Venezuela from 40,000 to 75,000 barrels daily and said that "we hope to build a refinery in Venezuela in the near future."

Short Gas Lines Built In New Oklahoma Area

Oklahoma Natural Gas Company is laying 7 miles of 6-inch line from Shawnee to the Center Point pool in Pottawatomie County to supply approximately 3,000,000 feet of gas for drilling rigs in the new field.

At the same time J. S. Crosbie, Inc., is reported to have completed two units to its new gasoline plant in Creek County which will utilize gas from the Stroud pool. The units will cycle about two million feet.

Delacroix Line Contract

Sharman & Allen, of Houston, have been awarded contract to construct 7.6 miles of 6⅝-inch pipe line from the Delacroix field to the Mississippi River, for The Texas Pipe Line Company. Work will begin at once and completion is scheduled for July 1.

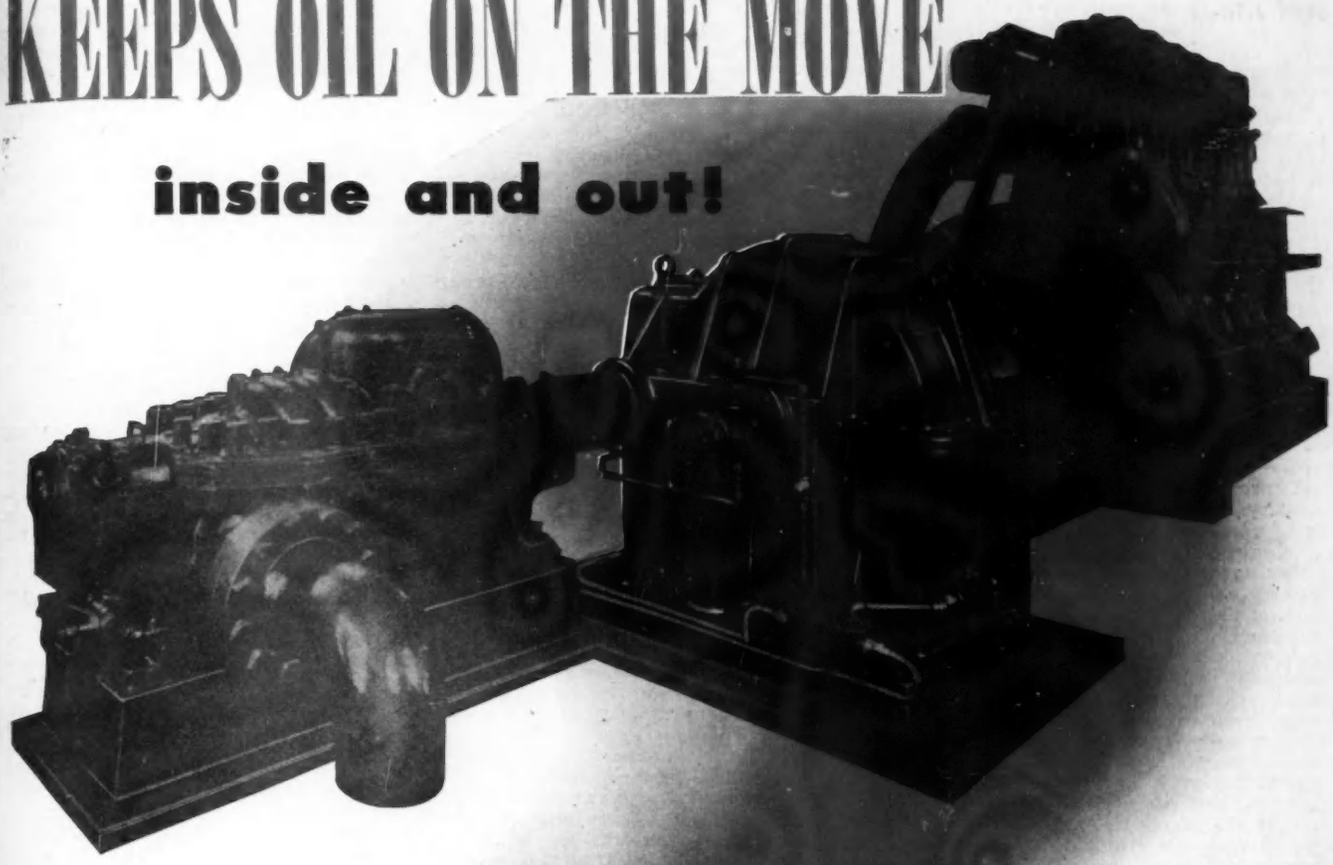
Plantation Elects

Officers and directors of Plantation Pipe Line Company which have been elected as follows:

C. R. Younts, president; F. E. Waterfield, Jr., vice president; S. V. Kane, secretary-treasurer; W. A. Dougherty, assistant secretary; E. Jack Mathews, assistant secretary-treasurer; H. B. Britton, chief engineer. Directors are W. F. Roth, N. J. McGaw, W. R. Finney and Younts.

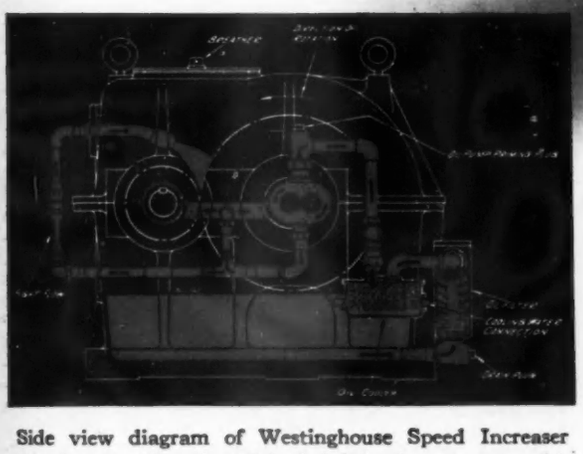
KEEPS OIL ON THE MOVE

inside and out!



Solve high-speed pump drive problems with Westinghouse pressure-lubricated

speed increasers



Side view diagram of Westinghouse Speed Increaser showing positive forced-feed lubrication system with oil pump cooler, strainer and lines, all externally mounted and easily accessible. Oil pump is always primed, ready for instant duty.

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GEARED DRIVES

API Meet

■ CONTINUED FROM PAGE 16

of channeling and by-passing by the encroaching water, is to be realized.

Well spacing alone is not the controlling influence on recovery efficiency, but control of the reservoir as a whole, in such a way that the most efficient mechanism of recovery is properly utilized, is what governs recovery. Much is yet to be learned about reservoir performance but knowledge accumulated during the past decade, if intelligently applied, will help solve these problems and research is being carried on to further improve methods.

A Method of Handling Salt Water Disposal Including Treatment of Water

By H. H. ELLISTON and W. B. DAVIS
Sinclair Prairie Oil Company

A properly designed salt-water-disposal system should include the disposal well, a salt-water-treating plant with open, closed or semi-closed system, gathering system and lease facilities for delivery of salt water to the system. Each of the component parts is of equal importance. If any one is incorrectly designed, unsuitable materials used or carelessly installed it will prevent the entire system from functioning effectively. Steps involved in the open system generally involve aeration, coagulation, sedimentation and filtration. In the closed system it is essential that the gathering and injection system be closed so that the water does not come into contact with the atmosphere. Based on the principle that corrosiveness of water usually is caused by the carbon dioxide content, the prevention of corrosion has been attempted more or less successfully by increasing the alkalinity and pH value of the water by soda ash or lime treatment. In order to do this it is necessary to remove partly or wholly the carbon dioxide in order to build up the mineral film on the pipe surface, the film being insoluble ferric hydroxide. Salt-water disposal now may be classed as "big business." Some service group should appoint a committee to prepare for the industry a manual on salt-water disposal, setting out the best methods so that any company may be able to design, construct and operate the most efficient system.

Coring with a Reverse Circulation Rig

By LEWIS FINCH, Jr., and WHITNEY M. ELIAS
Stanolind Oil & Gas Co.

In six West Texas dolomite wells core recoveries have been materially increased and the cost per foot of core recovered substantially reduced by adapting a procedure of reverse-circulation coring. This has been accomplished at little expense by modifying certain equipment on a reverse-circulation rig. This procedure provides for cutting a core and circulating the sections, as they are cut, to the surface through the drill string. Core recoveries averaging 97 percent, and in some cases as high as 100 percent, have been obtained and greater coring control has been maintained. Results obtained in the six West Texas wells show that out of 724 feet cored, 702 feet of core were recovered. The average coring time was 58 minutes per foot. Each core head used cut approximately 25 feet of section and the average total cost of a job was $2,336.98. This resulted in a cost of $19.37 per foot of core cut, or $19.97 per foot of core recovered. In all six wells the circulating fluid was oil. In the sections cored fragmentation of cores was not noticeable. Early in the experiment when core fragments lodged in the cutter head and tubing couplings the cores were relatively short and averaged about 2 inches in length. Improvements were made, the core suffered less jarring and sections recovered averaged 4 inches in length. In some instances pieces of formation lying adjacent to the drilled hole were dislodged and circulated to the surface. Several fundamental changes in equipment were made on the jobs affecting the kelly joint, gooseneck, drill hose, drill collar and core bits. Possibilities exist for adopting the reverse-circulation coring principles to conventional rotary rigs but additional experimentation is necessary to determine the feasibility of the method in unconsolidated sand and shale sections.

Forward with Free Enterprise

By J. EDGAR PEW, Vice-President
Sun Oil Company

Against a background of detailed accomplishments of the oil industry operating under the law of supply and demand, Mr. Pew declared that "To the end that the principles of free enterprise which our country has always stood for shall be maintained and preserved, the time has come when we should take stock of our situation as it exists today." In view of changed conditions as compared with two years ago, the speaker believed "the hour is approaching when Washington should commence making good upon their proclaimed intention of wholly restoring the oil and other industries to the free enterprise system."

"A good starting point would be elimination of requirements for reports of all kinds and character, many of them duplicates to different agencies. Another move would be to give back to the industry many of the technical and experienced men now working with governmental agencies — men who are needed so badly by us today. Adoption of those two steps would help solve our manpower problems. Nothing could be done that would give greater assurance to the American public today than restoration of the oil industry to the jurisdiction and operation of State laws."

Specific recommendations made by Pew included: return of well-spacing regulations to states having suitable conservation laws; further relaxation of materials regulations to the end that the oil industry should be assured all necessary items to carry on operations with an absolute minimum of red tape; a specific and definite deferment status for those engaged in the production and refining of oil based on their technical and practical experience; and a careful survey or audit by PAW in connection with representatives of the industry to determine the need for every regulation now in effect and for the purpose of eliminating every unnecessary detail or procedure.

Exclusion of Water from Wells

By E. A. STEPHENSON
Department of Petroleum Engineering, University of Kansas
In collaboration with P. T. AMSTUTZ, Jr.
Standard Oil Company of Ohio

A modified form of injecting oil into oil-water zones to exclude water has been developed in which a packer or similar device is so placed near the end of the injection string of pipe that when the device is expanded against the walls of the hole it effectively seals the oil strata above it from the water strata below. A back-pressure valve on the injection string, below the packer, will be opened when the pressure of fluid within the pipe is sufficiently high; the injection fluid will then be ejected directly against the water bearing sandface, and no significant portion of it will reach the oil pay. The treatment is thus concentrated upon the water-bearing zone, which is forced to accept the treating fluid when the injection pressures exceed the breakdown point. This method requires less oil, a shorter time for treatment, and insures more positive results. It is adaptable to any sands thick enough to permit segregation of the oil and water-bearing zone. Merits of the water exclusion treatment may be summarized as follows: (1) Lower lifting costs per barrel of oil. (2) Reduced investment in salt water disposal equipment. (3) Saving in wear on pumping equipment. (4) Curtailment of corrosion and its attendant expenses for maintenance and replacements. (5) Reduction in cost of treating oil since much clean oil is produced instead of emulsion. (6) Treatment is relatively inexpensive. (7) Practically impossible to damage a well by this procedure. (8) Readily adapted to successive low-cost applications as bottom or edge water encroachment makes repeated treatments desirable.

You and the API

By ROBERT E. ALLEN
Director Department of Information
American Petroleum Institute
New York

The primary objectives of the American Petroleum Institute, are to afford a means of cooperation with the government in all matters of national concern; to foster foreign and domestic trade in American petroleum products; to promote in general the interests of the petroleum industry in all its branches; to promote mutual improvement of its members and study of the arts and sciences connected with the petroleum industry, since there is no branch of the industry which is not susceptible to further improvement and progress. It is manifestly impossible to attain any one of these objectives without collaboration of the highest order. The dissemination of knowledge is where the front-line members of the API make good. By trial and error, by study and experiment, by adaptation and invention, the men in the field, in refineries, in offices and research laboratories, and at all other working posts in the industry learn of advances in practice and technique, and thereby further the supply of oil that is so vital to war and so essential in peace. The oil industry is country-wide and encompasses all the varied conditions that geology and geography can provide. Without a national correlation of the facts relating to similar problems in different areas the oil industry could easily remain provincial and the API, through its members, provides that national correlation of the facts of the industry. In a way the API functions somewhat as an academy of science, but instead of requiring attainment as a requisite of membership, some degree of attainment becomes the obligation of membership. Many of our members have found that their API work has given them a foothold on the escalator of achievement.

Markets • Statistics • Prices

Oils in Better Supply As Crude Runs Set New Record

Crude runs to stills were further increased materially in the week ended May 20, to a new all-time peak of 4,483,000 barrels per day, with the result that current demand for each of the major refined products was supplied without withdrawals from storage, which in former weeks were common. However, production of crude oil did not increase in proportion, although it was close to its all-time peak, and it evidently was necessary to draw substantially on storage of the raw material. The favorable reaction of refined product storage reflected, aside from the record breaking runs to stills, increases in production of both residual fuel oil and gas oil and distillate fuel, although production of gasoline was lower than in the previous week.

Crude runs to stills in all United States refineries, in averaging 4,483,000 barrels daily, were up 83,000 from the previous week and 30,000 above the former record runs of 4,453,000 barrels a day early this year. The new rate was above runs in the like week last year by the large amount of 794,000 barrels daily or 21.5 percent. Production of crude at 4,513,000 barrels a day was up 11,000 from the previous week and 507,000 barrels daily or 12.7 percent above the 4,006,000 barrels per day of output in the corresponding week last year. Stocks of crude totaled 234,706,000 barrels on May 13 but were indicated to have been reduced substantially from that level by May 20 through the record-breaking refinery runs, which nearly equalled the domestic crude production.

Gasoline production at refineries, including natural blended, averaged 1,934,000 barrels daily, down 12,000 from the week before but 446,000 daily or 30 percent above the output in the like week last year. With benefit of the large production, there occurred some contra-seasonal accumulation in storage, averaging 20,000 barrels daily, as stocks of finished and unfinished gasoline rose to 87,962,000 barrels. That quantity was 2,313,000 barrels or nearly 3 percent greater than the 85,649,000 barrels on hand May 22 last year. Until several weeks ago, the trend of gasoline stocks was somewhat under the trend for last year, indicating some improvement lately in the relative position of inventories.

Gas oil and distillate fuel production averaged 668,000 barrels daily, up 19,000 from the previous week and 152,000 per day or 29.4 percent above output in the like week last year. These light fuels accumulated in storage at the rate of 46,000 barrels daily and on May 20 totaled 31,088,000 barrels, a quantity slightly greater than the 30,837,000 barrels held on May 22 last year.

Residual fuel oil production averaged 1,202,000 barrels daily, up 2000 from the previous week and 142,000 barrels a day or 11.8 percent above output in the corresponding week last year. The production was large enough to result in accumulation of stocks at the rate of 34,000 barrels daily, as inventories recovered to 49,977,000 barrels. That quantity was, however, 17,777,000 barrels or 26.2 percent less than the 67,754,000 barrels held on May 22 last year.

Oklahoma Hearing

The Oklahoma Corporation Commission has set May 31 as the date for hearings to determine the amount of oil to be produced in the state during June and July, as well as to determine potentials of wells in Class B pools for July, allocation of gas in the West Cement Medrano pool and lower Charlson sand of the Chicksha field, and to promulgate regulations governing potentials of wells in the Wilcox zone of the Oklahoma City pool for July. Hearings will be held at 11:00 a.m. in Oklahoma City.

☆

RALPH U. FITTING, JR., geologist and engineer, and Tom L. Speed, petroleum engineer, formerly with Shell Oil Company and Sinclair Prairie Oil Company, respectively, have formed the West Texas Engineering Service Company with headquarters at Midland.

West Edmond Operating Committee Being Formed

Operators in the West Edmond pool, Oklahoma and Canadian Counties, Oklahoma, have taken initial steps to organize the West Edmond Engineering Association which will act as a cooperative unit to handle operating and engineering problems for the field. Committees have been named to draft an agreement, secure personnel and handle othr details preparatory to establishing a permanent organization.

Temporary officers include C. C. Peppers, Peppers Refining Company, chairman, and Wesley Payne, Anderson-Prichard Oil Corporation, secretary-treasurer.

Open Shreveport Office

Barnsdall Oil Company will establish a land and geological office in Shreveport about June 1 to serve the Arkansas, Louisiana and Texas districts, C. N. Valerius, district geologist, has announced.

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

(All figures in thousands of barrels—add 000)

HIGHS AND LOWS OF RECENT YEARS

ITEM	Crude Oil Prod. Barrels Daily	Crude Oil Prod. Week Ended	Runs to Stills Barrels Daily	Runs to Stills Week Ended	Crude Stocks Barrels	Crude Stocks Week Ended	Gasoline Stocks Barrels	Gasoline Stocks Week Ended	Gasoil and Distillate Stocks Barrels	Gasoil and Distillate Stocks Week Ended	Residual Fuel Oil Stocks Barrels	Residual Fuel Oil Stocks Week Ended
Highs:												
1941	4,337	11-22	4,120	10-18	266,187	3-29	99,727	3-29	[1]54,983	11-15	102,448	1- 4
1942	4,337	2- 7	3,961	1- 3	263,208	3-28	[1]109,281	3-14	49,861	11-14	95,857	1- 3
1943	4,436	11-13	4,331	12- 4	245,752	5-29	94,159	3-20	46,187	11-27	72,881	1- 2
1944	[1]4,519	5- 6	[1]4,483	5-20	240,992	1- 1	89,162	4- 1	42,310	1- 1	57,330	1- 1
Lows:												
1939	[3]1,601	8-26	3,125	2-18	[2]229,127	10-12	71,152	10- 7	20,722	4-15	105,397	4- 8
1941	3,364	1-11	3,490	1-18	240,399	11-15	79,923	10- 4	28,381	4-12	90,914	7-12
1942	3,297	7- 4	3,393	5-23	231,896	12-12	75,934	12- 5	29,240	4-25	72,962	12-26
1943	3,821	1- 9	3,579	3-13	232,191	1- 9	68,182	10-16	30,732	4- 3	57,596	12-25
1944	4,357	1- 1	4,228	2-12	233,632	4-29	76,302	1- 1	30,232	4-29	49,737	5-13

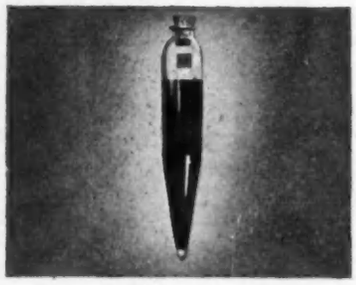
TRENDS OF 1943 AND 1944

Trends in Week Ended:	Crude Oil Production Daily	Crude Oil Runs to Stills Daily	Crude Oil Stocks Week End	Gasoline Production Weekly	Gasoline Stocks Week End	Gasoil and Distillate Production Weekly	Gasoil and Distillate Stocks Week End	Residual Fuel Production Weekly	Residual Fuel Stocks Week End
1943:									
January 2	3,871	3,734	233,938	10,957	82,420	4,285	42,913	7,683	72,881
January 30	3,826	3,698	233,863	10,339	88,830	3,888	37,057	7,452	70,763
February 27	3,873	3,709	235,217	10,566	93,157	4,230	32,939	7,839	70,140
March 27	3,896	3,742	239,126	10,231	94,079	3,541	30,980	8,018	67,938
April 24	3,913	3,737	242,035	10,583	91,001	3,954	31,142	8,168	67,455
May 29	3,970	3,679	245,752	10,656	83,937	3,798	32,274	7,672	67,682
June 26	3,955	4,015	242,657	11,092	79,589	3,876	34,044	8,126	67,960
July 31	4,133	3,788	238,420	11,127	74,977	3,765	36,363	8,478	66,877
August 28	4,196	4,227	236,170	12,420	72,525	4,351	37,928	8,732	67,250
September 25	3,344	4,156	233,013	12,206	70,024	4,608	40,328	8,560	66,659
October 30	4,383	4,176	237,219	12,813	69,297	4,642	44,591	7,968	63,833
November 27	4,414	4,261	239,761	12,638	69,980	4,379	46,187	8,633	62,143
December 25	4,363	4,185	241,310	12,597	74,024	4,457	43,791	8,689	57,596
1944:									
January 1	4,357	4,453	240,992	13,192	76,302	4,575	42,310	9,141	57,330
January 29	4,409	4,359	240,251	13,427	81,085	4,054	37,266	8,889	52,857
February 26	4,423	4,377	237,137	13,183	85,248	4,558	33,766	8,952	51,387
March 25	4,385	4,443	236,285	13,362	87,287	4,979	31,319	9,013	51,669
April 1	4,383	4,435	234,667	13,824	89,162	4,450	30,530	8,367	51,326
April 29	4,431	4,300	235,342	13,126	88,462	4,284	30,236	8,398	49,985
May 6	[1]4,519	4,316	234,166	13,115	88,267	4,118	30,438	8,946	49,841
May 13	4,502	4,400	234,706	13,618	87,823	4,545	30,763	8,399	49,737
May 20, 1944	4,513	4,483	.....	13,536	87,962	4,675	31,088	8,415	49,977
May 22, 1943	4,006	3,689	[4]241,457	10,415	85,649	3,613	30,837	7,422	67,754
Change:									
In week	+11	+83	+540	—82	+139	+130	+325	+16	+240
In year	+507	+794	—6,751	+3,121	+2,313	+1,062	+251	+993	—17,777
In year	+12.7%	+21.5%	—2.8%	+30.0%	+2.7%	+29.4%	+0.8%	+11.8%	—26.2%

[1] All time peak. [2] Lowest since April, 1922. [3] Lowest since October, 1922, due to shutdown of six Mid-Continent States. [4] Stocks, May 15, 1943.

EFFICIENT DEHYDRATING METHODS SHOULD PROVIDE THESE ADVANTAGES:

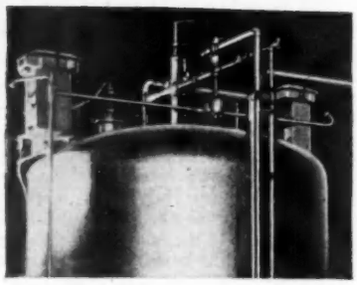
A *Lowest possible "cut." Minimum BS&W*



PETRECO DOES!

Petreco's varied electrodes, designed to treat effectively the many types of crude oil produced, insure efficient dehydration.

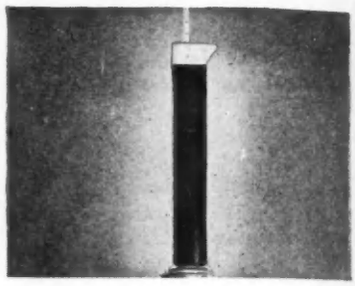
B *No loss of volume*



PETRECO DOES!

Petreco's vapor tight flow system prevents escape of more volatile fractions, thereby conserving the volume of oil produced.

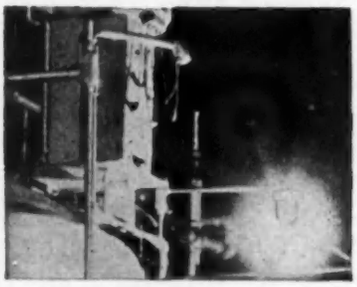
C *No API gravity loss*



PETRECO DOES!

Petreco's conservation of light ends holds the crude oil at its true gravity—this often enables the crude to command a better price.

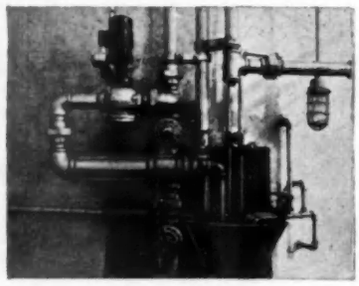
D *A constant performance indicator*



PETRECO DOES!

Petreco's "Pilot Light" tells the operator at a glance just how the unit is performing—when the light is bright, the oil is "clean".

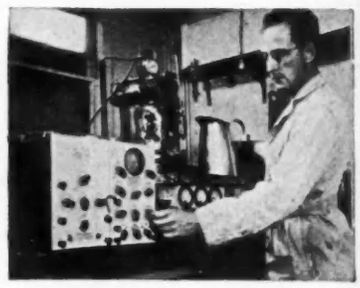
E *Automatic operation*



PETRECO DOES!

Petreco's automatic features allow the treaters to function virtually without attention, requiring only a minimum of the operator's time.

F *Complete field and laboratory service*

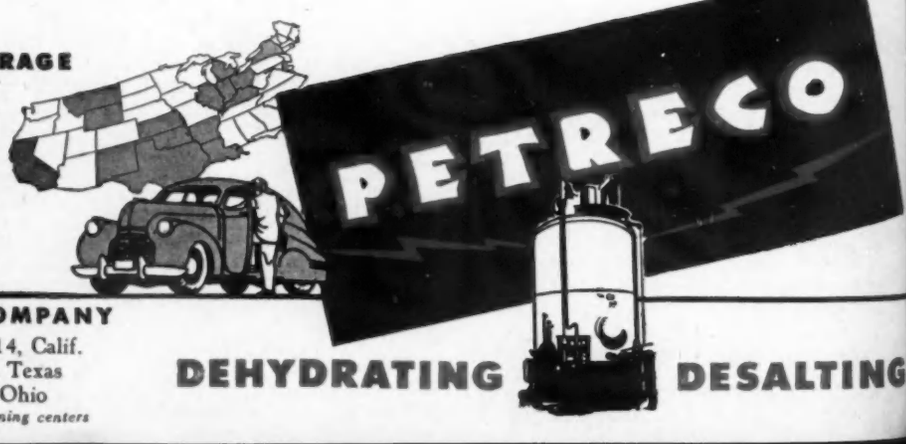


PETRECO DOES!

Petreco's field engineers are always available for service. Research technicians will gladly consult on emulsion problems.

COMPLETE OIL STATE COVERAGE WITH PETRECO PROCESS

Resident field engineers are located in refining and producing centers wherever Petreco processes are in use. These men are specialists, and are always available to assure maximum operating efficiency, and to give helpful advice and assistance on any problem of dehydration or desalting.



PETROLEUM RECTIFYING COMPANY

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648 Edison Building, Toledo 4, Ohio

Representatives in principal production and refining centers

DEHYDRATING DESALTING

U. S. Field Operations

Illinois Basin

Texas Company Test Gives Edwards County New Pool

A new pool for Edwards County was assured with McClosky lime production at The Texas Company's Lambright 1, SW SE SE 1-1n-10e. When casing was perforated at 3215-18 feet in McClosky lime, the well made 195 barrels of oil natural and some water in 24 hours. Operators continue to test. The well is located two miles northwest of West Salem and a mile southwest of the Parkersburg pool.

Superior Oil Company's Blood 1-A, NW SE SW 1-3s-10e, another Edwards County wildcat, has plugged back to 3190 feet to test Benoist sand which was swabbing 20 barrels of oil daily from 2989-95 feet after a shot. Only water showed in test of McClosky lime.

Wabash County: E. C. Skiles' Dunkel 2, NE NE SW 5-1s-12w, originally completed in the Biehl sand, has been deepened to Cypress sand at 1990-2009 feet and is flowing 125 barrels of oil daily natural after a 10-quart shot.

Wayne County: The Texas Company's Draper 1, N½ NW SW 8-3s-6e, a wildcat on production test of McClosky lime at 3352-60 feet, was making only 3½ barrels of oil and 24 barrels of salt water a day.

Franklin County: Two miles northeast of Ewing, Dave Ring's Clayton 1, SE SE SE 2-5s-3e, a wildcat, was coring at 3010 feet with some saturation reported in the lower O'Hara. Two cores in Aux Vases sand at 2958-63 and 2963-72 feet were disappointing.

Madison County: K. N. Bayer's Grimm 1, a wildcat in 20-4n-6w, southwest of Marine, was abandoned at 2478 feet after drilling through the Silurian lime.

Indiana

The Texas Company's Aschliman 1, SE 7-27n-13e, in Wells County in the northeastern part of Indiana and not many miles from the Ohio state line was drilling below surface casing.

George W. Boyce's State of Indiana 1, NE 23-3s-14w, in Gibson County, on Continental Oil Company acreage, will be drilled by directional hole to a spot below the Wabash river. A test of Devonian lime is scheduled.

Kansas

New Gas Pool Opened In Sedgwick County

Beech Aircraft Corporation has opened a new gas pool in Sedgwick County where Parrish 1, SE NW NE 29-28s-2e, a mile north of the Schweitzer gas field, initially tested nearly 2 million feet of gas from 2 feet of Stolnaker sand topped at 2045 feet. The company has several prospects which it is testing or plans to test in the near future.

Stafford County: Magnolia Petroleum Company's Ransom 1, SE NE 7-24s-11w, west of the Zenith West pool, has been given a daily potential of 2856 barrels from Viola lime topped at 3780 feet. Pipe was set at 3783 feet and after drilling plug and cleaning out to 3785 feet, total depth, the well flowed 45 barrels of oil an hour through 1-inch choke on initial test.

Pratt County: The new Coats pool opened by Lion Oil Refining Company may develop into a dual-zone field as the company's Andrews 2, SE SW SE 24-29s-14w, reports a good oil show in the Arbuckle in a core at 4366-80 feet. Arbuckle was topped at 4318 feet. Good show is also reported at 4420 feet, total depth, where pipe has been set. The well is checking higher than Andrews 1, discovery well which flowed 731 barrels daily from Simpson.

Ellsworth County: Cities Service Oil Company is acidizing Vacek 1, NE NE SW 32-15s-10w, north of the Stoltenberg field, after the hole filled with oil in 18 hours from 3320 feet, total depth.

Butler County: A strike about a mile southeast of the Brandt-Sensenbaugh pool appears in the making as Morris-Wolfe Creek's Wright 1, SW SE NE 25-28s-7e, pumped 75 barrels of oil with no water after acidizing from 2770 feet, top of the Mississippian, to 2780 feet, total depth.

☆

H. P. TAUBMAN, president of Buffalo Oil Company, Dallas, has been elected president of Maljamar Oil & Gas Corporation, New Mexico producing concern recently acquired by Taubman and associates.

Oklahoma

Pay in Pontotoc Series of Pennsylvanian Discovered

Helmerich & Payne found pay in the Pontotoc series of the Pennsylvanian at Freeman 1, SEc 14-1n-1w, Garvin County, 8 miles southwest of Wynnewood, making nearly two million feet of gas with a spray of 39-gravity oil estimated at about 50 barrels a day from sand at 1107-23 feet. The well is on an Ohio Oil Company farmout near a dry hole carried to 4365 feet two years ago.

West Edmond: A crop of new wells north of the West Edmond producing area are nearing critical depths while south of the field two failures dampened hopes that the new area might carry close to the Oklahoma City pool. Denver Producing & Refining Company's Bailey 1, CSW SE 19-13n-4w, Oklahoma County, 3 miles from production, tested salt water at 7330 feet, 7360 feet and 7602 feet. Hunton was topped at 7198 feet and pipe set at 7210 feet. D. D. Bourland's McDowell 1, SE SW 28-14n-4w, was dry at 6913 feet. The wildcat missed the Bois D'Arc section but had a slight oil show in the Bartlesville at 6635-58 feet.

Sohio Oil Company's Cargill 2, NE SE 30-14n-4w, offset to a dry hole in Section 29, is a completion from Bois

Wells Completed in the United States in Week Ended May 27, 1944

Data preliminary and subject to revision. Revised and more complete data on all completions shown in monthly summary of drilling, published in second issue of each month. More detailed data on wildcats published in third issue of each month.

State or District	FIELD COMPLETIONS: New Wells *Oil	Gas	†Input	Dry	Total	Old Wells Deepened	WILDCAT COMPLETIONS *Oil	Gas	Dry	Total	ALL COMPLETIONS This Week	Last Week	Cumulative This Year	Cumulative Last Year
Alabama	....	....	....	....	....	....	....	....	....	....	....	3	10	.....
Arizona	....	....	....	....	....	....	....	....	....	....	....	....	3	.....
Arkansas	....	....	....	....	....	....	....	....	....	....	....	5	74	105
California	26	....	....	....	26	2	3	....	4	7	35	34	803	524
Colorado	....	....	....	....	....	....	....	....	....	....	....	....	9	8
Georgia	....	....	....	....	....	....	....	....	....	....	....	....	1	1
Illinois	13	....	....	8	21	....	....	....	9	9	30	33	620	715
Indiana	3	....	....	2	5	....	....	....	1	1	6	3	112	107
Iowa	....	....	....	....	....	....	....	....	....	....	....	....	....	2
Kansas	7	....	....	2	9	....	1	....	6	7	16	32	685	660
Kentucky	7	....	....	2	9	....	....	....	3	3	12	4	255	115
Louisiana	8	....	....	2	10	....	1	....	2	3	13	13	286	236
North Louisiana	....	....	....	....	....	....	....	....	....	....	....	5	91	100
South Louisiana	8	....	....	2	10	....	1	....	2	3	13	8	195	136
Michigan	3	1	....	1	5	....	....	....	1	1	6	20	229	192
Mississippi	....	....	....	....	....	....	....	....	....	....	....	5	44	31
Missouri	....	....	....	....	....	....	....	....	....	....	....	....	6	7
Montana	3	....	....	4	7	....	....	....	....	....	7	6	117	71
Nebraska	....	....	....	....	....	....	....	....	....	....	....	....	7	20
New Mexico	2	2	....	1	5	....	....	....	1	1	6	6	168	107
New York	15	....	10	....	25	....	....	....	....	....	25	25	500	465
Ohio	3	6	....	4	13	....	....	....	....	....	13	4	306	343
Oklahoma	21	1	....	7	29	....	....	....	....	....	29	36	633	547
Pennsylvania	25	6	14	1	46	....	....	....	....	....	46	46	1,083	985
Tennessee	....	....	....	....	....	....	....	....	....	....	....	....	5	2
Texas	72	3	....	18	93	2	11	2	27	40	135	129	2,284	1,573
E.Tex.Bor. Co.'s	....	....	....	....	....	....	....	....	....	....	....	1	6	8
E. Texas Field	....	....	....	....	....	....	....	....	....	....	....	....	3	2
Rest of E. Texas	1	1	....	2	4	....	....	....	3	3	7	9	119	91
North Texas	10	....	....	11	21	1	6	....	6	12	34	34	528	361
W. Central Tex.	3	2	....	3	8	....	2	....	2	4	12	10	159	134
West Texas	32	....	....	....	32	1	1	....	1	2	35	35	631	369
Tex. Panhandle	6	....	....	....	6	....	....	....	1	1	7	6	87	89
G. Coast, Upper	5	....	....	1	6	....	1	1	1	3	9	11	209	110
G. Coast, Lower	8	....	....	....	8	....	1	1	3	5	13	11	338	236
Southwest Texas	6	....	....	1	7	....	....	....	8	8	15	11	168	145
S. Central Tex.	1	....	....	....	1	....	....	....	2	2	3	1	36	28
West Virginia	1	13	....	2	16	....	....	....	....	....	16	19	372	240
Wyoming	1	....	....	....	1	....	....	....	....	....	1	3	62	46
Total U. S.	210	32	24	54	320	4	16	2	54	72	396	426	8,674	7,102

* Include distillate wells. † Includes salt water disposal wells.

D'Arc section, flowing 300 barrels in the first three hours from 6843-6902 feet. The well has been pinched in to the field's recently reduced 200-barrel per day allowable. It is a north offset to Cargill 1, which missed the Boise D'Arc, plugged back and was completed in the Bartlesville.

Noble County: The West Sumner pool has its second producer with completion of Gulf Oil Corporation's Whitehorne 1, SW SE SE 36-22n-1e, from second Wilcox topped at 4584 feet. Tested from 4584-88 feet the outpost flowed 390 barrels of oil and 70 barrels of water through tubing choke during the first 24 hours. Testing continues.

Pawnee County: Deep Rock Oil Corporation's Calloway 1, NE NW 30-22n-7e, apparently has opened a new gas field. Originally carried to 3275 feet and unsuccessfully testing the Wilcox, operator was preparing to abandon the hole when it blew out at approximately 2600 feet. Brought under control the wildcat was tested at 2610-20 feet and showed for approximately 4,000,000 feet of gas.

Washita County: Gulf Oil Corporation's Hare 1, CNW SW 8-8n-20w, west offset to Hopkins 1, discovery wildcat, is not doing so well in the upper Granite Wash zone. The test flowed 270 barrels of oil and 30 barrels of water in 20 hours from 5585-5630 feet. The lower Granite Wash zone topped at 6425 feet will be tested. The 33-gravity oil is being trucked to Tipton. The company has a block approximately 8½ sections.

Cleveland County: Sunray Oil Company's Hardin 1, CNE SE NE 31-10n-3w, which is attempting to extend the West Moore pool to the southwest, is reported checking low with the field wells.

Osage County: Mealy-Wolfe Drilling Company's Twyman 1, SWc NE 14-24n-8e, a Hominy-Wilcox sand test, blew out at 781 feet and flowed at the rate of 4,000,000 feet of gas before it was brought under control.

Texas Panhandle

Two Major Extensions to Panhandle Gas Belt Likely

The Texas Panhandle has two major extensions to its gas belt in process of completion. In Moore County, Phillips Petroleum Company's Love 1, H&TC 200, Block 44, 3⅜ miles northwest of nearest production, tested 20,000,000 feet daily from Permian at 3360-3549 feet, then dropped to 13,000,000 feet daily on preliminary test after using 8250 gallons of acid. This outpost was drilled to water at 3749 feet, or 6 feet above sea level. In Sherman County, Kerlyn Oil Company's Sealy-Stanolind 1, C SW SE T&NO 413, Block 1-T, situated on a general trend with gas in the Texas and Oklahoma Panhandle, rated at 4,800,000 feet daily with some water showing from broken lime at 2975-3117 feet. Nine-inch pipe was cemented at 2927 feet to be prepared to drill to 5500 feet.

Deep Tests: Phillips Petroleum Company's Whittenburg 73, H&TC 63, Block 46, northeast sector of the Borger oil area and the first Ordovician test for the county, was abandoned in Ellenburger at 7628 feet. In Oldham County, Stanolind Oil & Gas Company's Herring 1, 13 miles northeast of Vega, cemented hole to try and restore circulation at 4527 feet, with 6500-foot depth contract.

New Mexico

Lea County's First Well Of Year Is Registered

Natural flow of 175 barrels of oil on 7-hour test through open tubing was registered by The Texas Company's Baskin 1, C SE SE 22-19s-33e, in opening the first oil discovery for Lea County this year. Production is from Seven Rivers sand, topped at 3555 feet with elevation of 3632 feet, and drilled to 3574 feet. Gas-oil ratio average 885/1, and flowing pressure on tubing and casing was 300 pounds and 500 pounds, respectively. This discovery is 5 miles northeast of the Salt Lake pool, nearest production, and is on a narrow reef lime structure, based on subsurface control from nearby failures.

Humble Oil & Refining Company's Leonard-Federal 1, C SW SW 12-26s-37e, second deepest operation for the state, was drilling cherty-lime at 10,435 feet, in Montoya, topped at 10,264 feet, or 2550 feet low to a test 6 miles north that quit in granite. The company proposes to drill to Ellenburger, or granite. Sufficient oil saturation was passed up in Silurian at 9897-9928 feet to justify setting pipe. El Paso Natural Gas Company's Ginsberg 1, 1 3/8 miles northeast of the county's first deep test, is idle at 11,014 feet, in Montoya, topped at 10,710 feet, or 2902 feet low. The latter set the depth record for the state. In the Maljamar area, Barney Cockburn et al's Wyatt 1, C SE SE 33-17s-33e, was having difficulty in making hole in hard cherty-lime at 6159 feet. Continental Oil Company et al's Skaggs 2-B-23, scheduled Ellenburger test for the Skaggs area and ¾ mile southeast of Monument field, was drilling dolomite at 7860 feet after drill-stem test at 7695-7825 feet yielded 3400 feet of rotary mud, 2760 feet of oil- and gas-cut mud, averaging 10 percent oil, and 620 feet of sulphur water.

Eddy County: Sanders Bros. et al's Hultman 1, mile north of Artesia, halted at 6357 feet to run pipe after logging shows of oil at intervals from Pennsylvanian. Standard Oil Company of Texas' Smith 1, SW NE NW Section 23-22s-24e, was awaiting plugging orders at 3840 feet, thus terminating the company's Delaware prospecting in the west part of county.

West Central Texas

Oil Field Discovered in North Central Stephens

Northern Ordnance, Inc. discovered an oil field in North Central Stephens County when Robertson 1, 1¼ miles southeast of Crystal Falls, flowed 7 barrels of oil hourly natural on 10-hour test from lime at 3222-36 feet in Bend, topped at 3221 feet. The well was shut in to erect tankage, and is due to be acidized. It is in TE&L 1142, and 1 7/8 miles northwest of an old sparsely drilled area.

Tom G. Shaw et al's Whalen 1, which opened a prolific gas area in Northeastern Stephens County in 1941 from Marble Falls at 4077-95 feet, has converted itself into an oil producer, flowing 56 barrels daily through open tubing from the same horizon. Carey & Carey's Cretsinger 1, ⅜ mile north by west of this discovery, was completed July, 1943, rated at 11,450,000 feet of gas daily from Marble Falls perforations at 4066-78 feet, and has since developed a flow of 33 barrels of oil daily. Both wells are connected to Phillips Petroleum Company's gas system.

Jones County: New Idria Quicksilver Mining Company's Kelso 1, T&P 25, Block 17, opened a new pool in pumping 344 barrels of 46-gravity oil initial after using 1000 gallons of acid in Gunsight at 2562-66 feet, having plugged back from 2571 feet. This strike is 5000 feet southwest of Wimberly field, and same distance north of the Reddin pool.

West Texas

Important Extension of Yates Zone Is Reported

An important west and south extension for the Yates zone in Pecos County has been recorded by Humble Oil & Refining Company's Williams 1, C NW NE GC&SF 3, Block 114, 7½ miles northwest of Fort Stockton. This wildcat entered the Yates at 2743 feet with elevation of 2845 feet, and produced sweet gas at rate of 5,210,000 feet daily on brief drill-stem test at 2726-75 feet. Drill-stem test at 2831-84 yielded 830 feet of fluid, including 480 feet of 36.5-gravity oil. The prospect was coring dry lime with broken oil saturation continuing to 2906 feet. Williams 1 is 5 1/3 miles east of the Richards (Courtney-Pryor) 1300-foot 3-well pool, nearest production, and it is the first test for the area.

Standard Oil Company of Texas' Mac-Der 1, lease 3, 3½ miles east by south of the company's recent gas discovery from the 4700-foot Wolfcamp, missed the producing zone and cored granite at 5016-19 feet. Top of granite is 555 feet high to the gasser. The Texas Company's Alexander 1, 2 miles northwest of the Apco-Warner deep field, was drilling shaly-lime at 5060 feet, and structurally low. Magnolia Petroleum Company et al's LeMar 1-A, south offset to the dormant Ellenburger producer for the Owego pool, was coring at 4508 feet in Ellenburger, topped at 4258 feet, 246 feet low. No water has been encountered.

Crockett County: Watchorn Oil & Gas Company's Thompson 1, Ellenburger project for the northeast edge of the Yates field, was drilling lime at 6450 feet, with top of Crinoidal (Basal Pennsylvanian) called at 6435 feet. Top of Pennsylvanian was logged at 5870 feet with elevation of 2165 feet, being lower than Ordovician failures drilled on the east and southwest flanks of the field.

Crane County: Gulf Oil Corporation's Waddell et al 49, north offset to McKnight pay discovery in the northeast sector of Sand Hills field, became the first dual completion for the area in flowing 1591 barrels of 32.8-gravity oil, plus 2.66 percent water from McKnight perforations at 3390-3420 feet. It previously rated 1341 barrels of 35.7-gravity oil on potential through casing after using 9500 gallons of acid in Clear Fork at 4428-4814 feet. Magnolia Petroleum Company's Lea 10, old Clear Fork producer that has indicated a

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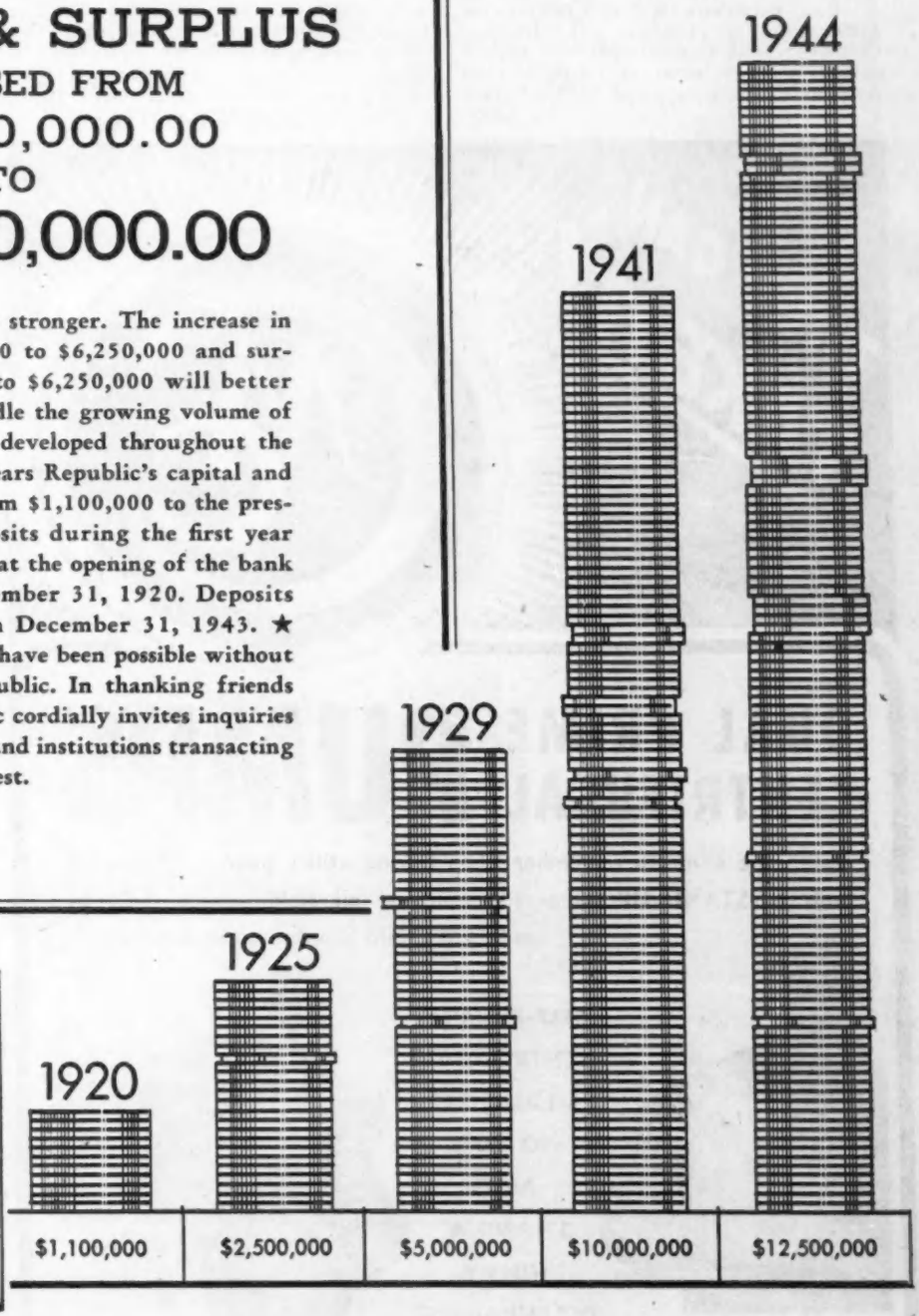

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small oil well from McKnight perforations, will also attempt to dual complete.

Cochran County: Dust-bowl acreage acquired by the U. S. Department of Agriculture with 6¼ percent of the royalty minerals reserved by the former ranch owner has been sold under competitive bids to 6 companies, but subject to formal approval by Washington. Successful bidders agree to pay an aggregate of $100,218.70 for six 2480-acre tracts, or about $7 per acre, for commercial leases, with royalty scaled from 12½ to 32 percent. Stanolind Oil & Gas Company bid $27,662.80 for 2489 acres in League 151, Randall County School Lands, while the lowest priced acreage went to Humble Oil & Refining Company for $6135.15, embracing 2452 acres in League 135, Armstrong County School Lands. The acreage has been partly explored with negative results to the San Andres section of the Permian.

Andrews County: Sinclair Prairie Oil Company's Grisham-Hunter 1, 6¼ miles west of West Andrews field, cemented 5½-inch at 11,193 feet in Ellenburger, topped at 11,121 feet with elevation of 3242 feet, and will be perforated in the latter zone after failing to complete drill-stem tests. Granite was entered at 11,315 feet. Humble Oil & Refining Company's Scarborough 1, west part of county, recovered water blanket and 60 feet of rotary mud when tester was used at 10,586-10,674 feet in Ellenburger, topped at 10,612 feet with elevation of 3337 feet, and was drilling dolomite at 10,730 feet. The latter's Carter 1, Deep Rock area, cemented 5½-inch at 10,356 feet after plugging back from lime at 11,812 feet to 10,360 feet to perforate in Mississippian, or Silurian. Shell Oil Company's Cox 1, 4 miles northwest of Union field was drilling lime at 10,080 feet on Ellenburger objective. Mid-Continent Petroleum Corporation's University 1-7, Clear Fork failure for southwest flank of Fullerton field, was drilling lime 7710 feet with same goal. Five nearby lease owners contributed $50,000 toward deepening this test, which failed in the Fullerton zone due to subnormal porosity rather than off-structure position.

Gaines County: Humble Oil & Refining Company's Doss 1, 3½ miles northwest of the Robertson one-well Glorietta pool, cored broken oil saturation at 4726-46 feet, but drill-stem test was negative. It is due to drill to 8000 feet, or water in the Fullerton zone of the Clear Fork. Gulf Oil Corporation's Buck 1, 1⅝ miles northwest of wildcat gasser in Yates at 3475-90 feet, missed the gas zone in drilling below 3710 feet. Top of Yates was called at 3410 feet with elevation of 3288 feet, being 2 feet low. Case, Pomeroy & Company's Kuehn 1, 4 miles southeast of Seminole, entered brown lime at 4400 feet with elevation of 3236 feet, and was drilling 4890 feet.

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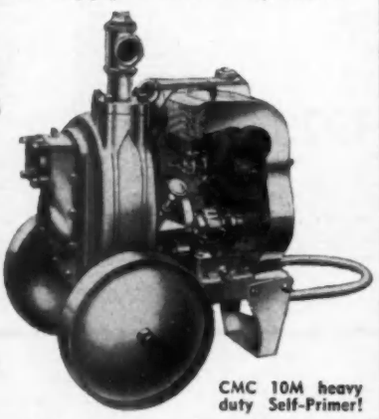

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Southwest Texas

Wildcat Activity More Active in Several Counties

Wildcat activity was very high in the Southwest Texas district, with several locations being staked in Nueces, Karnes, Hildalgo, Duval, San Patricio, and Jackson Counties. Harvey & Henderson opened up production in Duval County with a small pumper, J. F. Welder Estate 1, S. Alexander survey 120, 1½ miles south southeast of Eagle Hill field. The well went to 2076 feet cleaned but would not flow. It swabbed 8 to 10 barrels per hour and was shut down to install pumping equipment.

H. J. Porter's J. F. Welder Heirs 2, was rigged up 4 miles west of Fitzsimmons field, 660 feet from the northwest and southwest lines of M. G. Andrews survey 20. It will go to 4500 feet.

Hiawatha Oil & Gas Company completed M. M. Miller 16, Section 22, Santos Flores Grant, in the extension area of Southland field, for a potential of 85 barrels of 41-gravity oil daily on a ¼-inch choke. Production is from the Pettus at 5330-35 feet, a new horizon for this field.

Jackson County: Mid-Continent Petroleum Corporation extended West Ranch northeast with E. H. Seidel A-1, flowing 145.8 barrels of 31-gravity oil per day through 13/64-inch choke. Production is from perforations in sand topped at 5737 feet, total 5790 feet.

Two wildcats were located in the La-Ward area, east of Edna: Butcher-Arthur, Inc.-Salt Dome Oil Corporation have staked J. W. Young Estate 1, 280-acre lease in the W. J. E. Heard League A-31, and W. T. Westoff et ux 1, on a 40-acre lease in the same survey. Both are projected to 8000 feet.

Victoria County: Edwin Nielsen et al's John Kounty 1, wildcat discovery at North Keeran, Block 13, Agapito de Leon survey, 7 miles south of Inez, proved disappointing in open hole completion, casing having been set high. It

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was making 5 to 10 barrels of 25-gravity oil and a lot of gas on 7/64-inch choke. To convert it into an oil well probably will require perforated liner set to bottom, shutting off the top of the sand. Total depth is 4757 feet.

Karnes County: Arkansas Fuel Oil Company's E. L. Wood 1, southwest outpost at Runge field, had shows indicating a possibility of its becoming the best well in the field. Drill-stem tests at 6572-78 feet recovered 1150 feet of oil on ¼-inch chokes in 15 minutes; a test at 6578-82 feet recovered 1775 feet of oil and 15 feet of brackish water in 30 minutes. It was cored to 6585 feet for further testing. The company has staked Wood 2, west of Wood 1.

Amerada Petroleum Corporation's J. F. Wood 1, in Maria de J. Ybaro Grant, 2½ miles southwest of the Slick-Wilcox field, was abandoned after testing Wilcox at 7476-7508 feet, with shows of salt water. Total depth in sidetracked hole was 8904 feet. Navarro Oil Company's Francis Gauntt 1, in the Burnell area, was drilling below 6501 feet. It will go to 7000 feet.

DeWitt County: Butcher-Arthur's Kolodziejcyzk 1, 7 miles northeast of the Slick-Wilcox field, got salt water in its final test at 7532-37 feet.

McMullen County: Edwin M. Jones' Harry Ezzell C-2, wildcat in Section 54, W. D. Hodges survey 330, 4 miles southeast of Ezzell field, flowed 54 barrels of condensate a day with 6,000,000 gas on a ½-inch choke. It was perforated at 6451-53 feet, reperforated at 6926-28 feet and tested salt water. Perforations for completion attempt will probably be made between these levels.

Brooks County: Humble Oil & Refining Company's Scott & Hopper 4, SE ACH&B Survey 107, 1320 feet north of No. 1 at Scott & Hopper field, recovered 2800 feet of oil on a 20-minute drill-stem test above total depth of 6133 feet. The test was evidently made in the 6100-foot sand, one of the horizons from which the dually completed Scott & Hopper 2 is producing. Humble Oil & Refining Company has spotted Scott & Hopper 5, 1320 feet north of No. 4.

Willacy County: Humble Oil & Refining Company has staked a test in the Willamar north extension area opened last week at Sauz Ranch-Mulatos Pasture 3, 1980 feet north and 11,220 west of the northeast corner of share 13, de Carricitos Grant 1320 west of No. 2 which is setting surface casing. Sauz Ranch 1 recently completed for 184 barrels of 30-gravity oil from perforations at 7950-68 feet.

Hildalgo County: Baldridge, King & Nichols-Sohio Petroleum Company's Goldston 1, wildcat in the Santa Anita Grant, is coring at 6897 feet in sand carrying odor of condensate. Drill-stem test at 6718-30 feet reported 50 feet of condensate cut mud with 325 pounds water pressure in 15 minutes.

The nearby recently opened Los Indios field received a new location as Navarro Oil Company spotted King Estate 1, 2640 feet south of the discovery well on a 160-acre lease.

T. H. WILLIAMS, deputy supervisor of the oil and gas division of the Texas Railroad Commission at San Angelo, has resigned to become manager of Northern Ordnance, Inc's district office at Big Spring, Texas. Edwin Bierschwale, field inspector, succeeds Williams at San Angelo, and John W. Scheuber of San Angelo will be field inspector.

East Texas

Manziel Northwest Has Good Paluxy Pay Section

Expansion of the Manziel field, Wood County, to the northwest with above-average Paluxy pay section was assured when Amerada Petroleum Corporation and Sun Oil Company's McWhirter 1-A, Wm. Barnhill survey, logged oil sand at 6312-24 feet and main pay at 6350-80 feet. Pipe was landed at 6408 feet, or 3 feet off bottom. Adjacent 40-acre units will be drilled promptly as result of the favorable sand conditions revealed by this ¼-mile outpost.

Magnolia Petroleum Company's Herring 2-A, Sam Burch survey, missed the Paluxy in drilling to 6375 feet, and may try to sidetrack with a directional hole. Shell Oil Company's Herring-Scoggin 1, which is seeking Pettit production for the Manziel structure, was fishing for drill pipe at 8520 feet.

Allied Oil Company's Chrietzberg 1, Wood County wildcat, a mile southeast of Quitman townsite, entered Georgetown at 5815 feet with elevation of 431 feet, and was idle for rig repairs at 6780 feet. Magnolia Petroleum Company's McGee 1, 6 miles south of Yantis, was drilling at 4050 feet in Austin chalk, topped near the 3945-foot level, and is checking flat with a deep failure to the northwest.

Smith County: Bobby Manziel et al's Morrison 1, Friendship area, cemented 5½-inch pipe at 7550 feet and will set liner from this point to bottom of hole at 8109 feet. This wildcat logged promising shows in Pettit at 7915-36, 7939-54, 7959-81 and 8038-55 feet, and entered Travis Peak at 8074 feet.

Henderson County: Lone Star Gasoline Company's McElreath-Suggett 2-C, second completion for the Opelika field and discovery gas-distillate producer from the Rodessa, gives promise of becoming the first to produce from the Travis Peak, having logged favorable saturation and porosity in deepening to 9351 feet. It was completed originally from perforations at 7910-50 feet, which were squeezed with cement. The company will try for dual completion from Travis Peak, and from perforations at 8845-8907 feet.

Deep Prospects: The Texas Company's Turlington 1, northeast Rusk County, entered Travis Peak at 6920 feet, and was drilling dry sandy-shale 6930 feet. The same company's Easley 1, Van Zandt County, logged first Glen Rose at 6675 feet, and was drilling at 6785 feet. In the same county, Humble Oil & Refining Company's Surratt 1, was drilling shaly-lime at 6570 feet.

Anderson County: Magnolia Petroleum Company's Horwitz 1, 1/3 mile east of the Concord one-well pool in Woodbine, was eliminated as a Basal Trinity project in entering solid salt at 6010-6327 feet. Due to displacement of formations arising from the salt plug, a thin section of Upper Glen Rose and a stray anhydrite were logged before entering Georgetown at 5525 feet.

Sand Flat: Skelly Oil Company's Chisum 2, ¼ mile east by north offset to its discovery, is the largest of three Paluxy wells in flowing 216 barrels natural through 3/16-inch choke from perforations at 7083-85 feet. The company is starting Chisum 3, but other lease owners have discontinued Paluxy development after three tests proved dry in this zone.

North Texas

Lester Discovery Offset Strikes Shallower Level

Shell Oil Company's Lester 1-B, north offset of its prolific Mississippian discovery in the Lester pool, Jack County, established a shallower pay for the area in flowing 122 barrels of oil on 16-hour natural gauge through open tubing from perforations at 4906-14 feet in Bend, topped at 4555 feet, 44 feet low. This well proved dry in the Mississippian, which is 160 feet low, and was plugged back after finding water in Ellenburger at 5694-5744 feet.

Cooke County: Leadership on drilling activity in the district has shifted to the Woodbine pool, eastern Cooke County, where Northern Ordnance, Inc. is waging the most ambitious development program staged in the district for more than a decade. The company has 24 operations, including semi-wildcats. This activity also embraces 8 tests that are awaiting official gauge, or have landed pipe for completion, and 13 additional rigs are in service. Fred Snuggs et al and Seitz-Comegys & Seitz are starting development of their close-in leases. Northern Ordnance Inc's S. P. Ware 1, Wm. Moore survey, 3 miles south of the discovery, resumed coring at 4382 feet after testing 20 feet of oil-cut mud from sand at 4350-60 feet, and 30 feet of free oil from lower break in the Strawn at 4375-82 feet. The company's Henry Ware 2, Santos Survey, apparently missed the numerous oil zones in the Strawn, and was awaiting orders at 4867 feet in Ellenburger, topped at 4805 feet. The first test in the northeast portion of the 127-acre lease showed for a prolific well from sand at 4556-61 feet.

Archer County: Phillips Petroleum Company's Wilson-American 1, Lot 1, ATNCL 114, within a circle of deep failures, proved dry in Bend, topped at 4892 feet, and was drilling shale at 5310 feet. Consolidated Oil Company and Premier Oil Refining Company's Garrett 1, John Walker survey, found Mississippian dry at 5400 feet, and was drilling dry lime at 5490 feet. Gulf Oil Corporation's Jones 1-E, situated 3 3/4 miles to the northwest, entered Mississippian at 5575 feet, with nominal saturation at 5580-5607 feet, where drill-stem test is pending.

Oklahoma Lease Trades

Stanolind Oil & Gas Company has purchased leases on 600 acres in Oklahoma and Canadian Counties from Frank Russell, including one drilling well, the seller reserving a small royalty interest.

Continental Oil Company has purchased from David G. Powell and H. R. Johnson of Tulsa, the southeast quarter of Section 21-14n-4w, West Edmond area, paying $65,000 cash and $35,000 out of production. Purchaser agreed to spend 260,000 in developing the lease, and sellers retain a half interest after oil payment has been made.

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Texas Gulf Coast

New Impetus for Wilcox Production in Polk County

Wilcox production along the Texas Gulf Coast trend had new impetus last week as Humble Oil & Refining Company brought in Granbury 32, Section 2, A. Viesca grant, in the Livingston field, Polk County, 1284 feet southwest of Granbury 7, which recently opened Wilcox production in that field from sand at 6980 feet. Granbury 32 is producing from perforations at 7000 feet, and flowed 164 barrels in 14 hours. Total depth is 7080 feet.

Shell Oil Company has made location for another Wilcox test in the field, H. J. Pratt 1, on a 226-acre lease, A. Viesca grant, a northwest offset to Granbury 7. The well will go to 7100 feet. Sun Oil Company also is deepening an old Cockfield producer at Livingston to test Wilcox sands.

J. Z. Werby et al have located a Wilcox test, Saner Ragley Lumber Company 1, on Houston County School Land survey, A-272, in another part of the county. Active Wilcox wildcats are drilling in Liberty, San Jacinto, Grimes, and Colorado Counties.

Chambers County: Tests of a new and deeper sand at Smith Point are being made by Standard Oil Company of Texas at State-Galveston Bay 109-3, northeast extension test 1½ miles offshore in Galveston Bay. Drilled to 9785 feet, casing was perforated at 9707-9716 feet and 9723-31 feet. Shows indicated a large amount of gas and salt water, along with oil. Operators are now killing the well for a squeeze. New perforations will be made in the same zone. This well missed the 8100-foot sand found in two wells to the southwest.

C. M. and V. W. Frost brought in Fee 8, NE SW HT&B 95, at Fig Ridge from sand topped at 8533 feet. Initial potential was 291 barrels of 35.1-gravity oil a day on 5/32-inch choke. Total depth was 8493 feet.

Montgomery County: Superior Oil Company has made another triple completion at Lake Creek field—McWhorter et al D-1, flowing 554 barrels 54.6-gravity condensate daily on 20/64-inch choke, from 9278-93 feet; 162 barrels 56.5-gravity per day through 20/64-inch choke, from 9796-9820 feet; and 216 barrels of 56-gravity condensate on 20/64-inch choke from perforations at 10,174-284 feet, through tubing. Hole was drilled to 10,360 feet.

Hardin County: American Republics Corporation and Houston Oil Company have made location for H&TC Fee 2, in H&TC 189, Beech Creek area, 933 feet west of their discovery well, H&TC Fee 1. Fee 1 is 1½ miles southeast of the same operators' Sternenberg 1, which opened North Beech Creek field. The two discovery wells are reported separated by a fault, and though both are flowing from the 6200-foot level, Fee 1 is 200 feet structurally lower than Sternenberg 1.

Harris County: Danciger Oil and Refining Company is testing Nadaline Sellers 1, tight wildcat on NE¼ HT&B 2, 1 miie west of Spring. It was reported to have swung 7-inch casing at 6175 feet. One test showed salt water. The company has erected derrick for a test south of Spring.

Galveston County: Glenn McCarthy's Maco Stewart 1, an old well being deepened on the east flank of the Hitchcock pool, James Spillman survey, originally completed for 468 barrels a day at 5131-foot sand, has been killed and is now drilling below 12,000 feet.

Orange County: The Texas Company's Orange National Bank 5, on the east flank of Port Neches field, J. Beaumont survey, was abandoned at 7460 feet. The field has produced from formations at 3150 to 5975 feet.

Matagorda County: Ohio Oil Company's Hefflefinger and Hermanson 1, P. Burnett survey, lot 18, 4 miles northeast of Blessing, perforated for drill-stem test at 8870-73 feet. Recovery was 23 stands of salt water and 2 stands of salt water and mud. Operators plan to squeeze and reperforate at 8810-32 feet where earlier shows of condensate and gas were picked up. Total depth is 9716 feet.

☆

MARION D. SELF, West Texas district land man for Magnolia Petroleum Company Midland, has resigned to operate as an independent, and will be succeeded by Steve P. Hannifin, who has been in charge of the company's land office for New Mexico at Roswell.

PHILLIP TABER, Tulsa, C. B. Coleman, Oklahoma City, and E. B. Gill Drilling Company, which has been operating in Illinois, have merged their interests to operate as T.C.G. Drilling Company with headquarters in the Eastham building, Midland, Texas.

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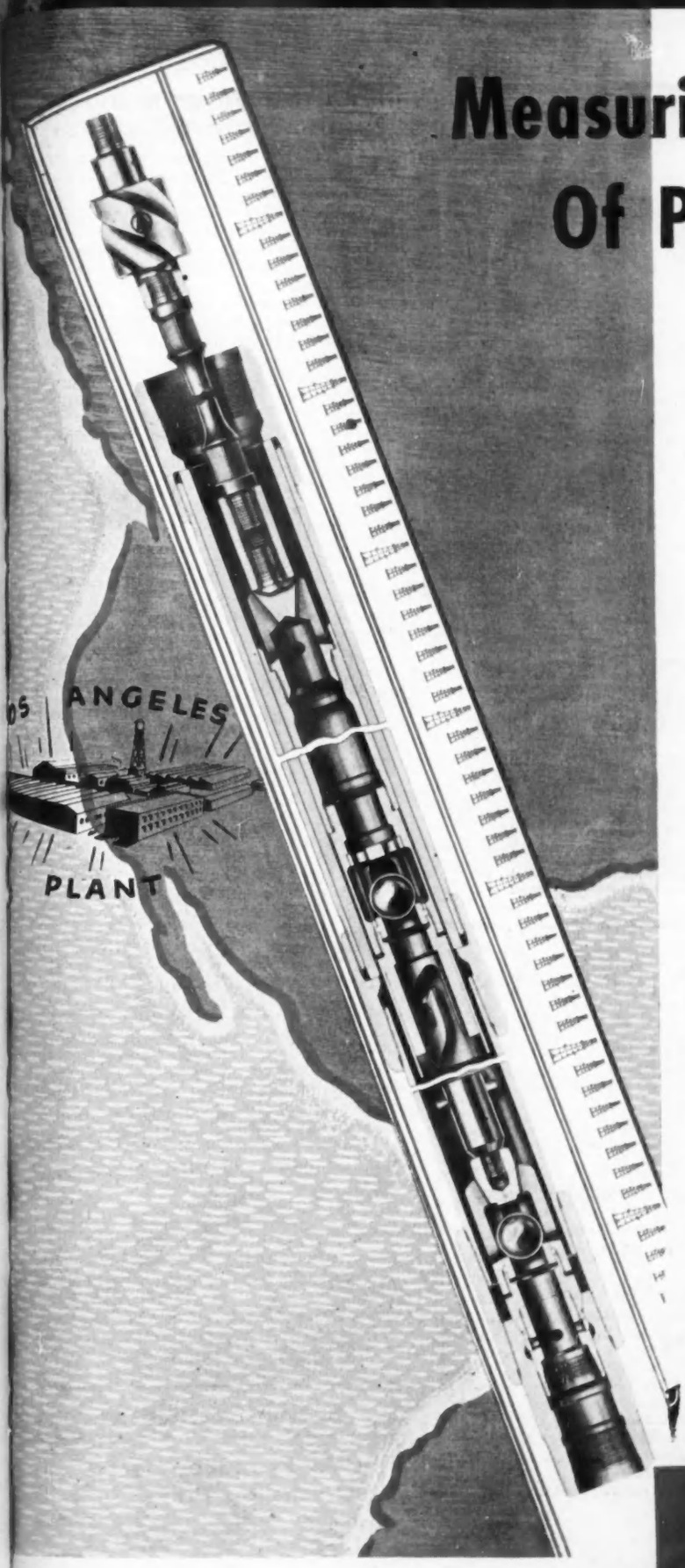

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Principal, The Mining and Technical Institute, Leicester, England

This book gathers into one convenient volume and explains all of the important and accepted means of surveying the courses of deep boreholes and orientating their cores. It traces the evolution of modern borehole-surveying devices, and adds various problems relevant to strata, location and orientation.

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CHAPTER HEADINGS

1. Deviation and Its Causes
2. Auxiliary Registrations in Borehole Surveys
3. Instrumental Survey of Boreholes
4. Fluid Methods of Surveying Boreholes
5. Core Orientation
6. Compass and Plumb-Bob Methods
7. Pendulum Methods
8. Photographic Methods
9. Gyroscopic Compass Methods of Surveying Boreholes
10. Geophysical Methods of Investigating Boreholes
11. Problems
12. Bibliography

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Protest Changes in Rules For Mascho and Furhman

Proposals to change the rules for the Mascho and Furhman fields were protested last week at a hearing before the Texas Railroad Commission. The present argument arose over the proposal of Standard Oil Company of Texas to establish a boundary line between the fields, so that part of their wells now in Furhman would be included in Mascho.

While the other operators had no objection to increasing the acreage assigned to Standard Oil Company of Texas wells, they wanted no more artificial boundaries between fields. They pointed out that this caused trouble in the McElroy area.

None of them would urge the application of uniform rules to the two fields, although it appeared from the testimony offered that they were producing from a common reservoir.

Similar objections were raised at another hearing on the establishment of an artificial boundary between the Slaughter and Rhodes fields. The situation was almost identical, as in each field the size of the proration units varied and the method of distributing the allowables is different.

Apparently the commission will have to work out some plan which will permit the use of uniform rules in these fields.

In each instance the discovery wells were several miles apart, but drilling subsequently joined the areas into one field.

It is possible that in working out these two proposals the commission will establish a uniform policy that may be applied hereafter.

More Asphalt Oil From Texas Fields

The Petroleum Administration for War has increased the allocation to Texas for June by 8000 barrels. PAW asked for the production of this much more asphalt crude oil, which the commission ordered produced from the Talco and Hawkins fields.

This means that the total production from Texas for June, according to PAW recommendation, will be 2,171,000 barrels of oil daily.

D. G. (DAVE) HAWTHORNE is now associated with E. O. Bennett, petroleum consultant, Houston. Hawthorne was formerly chief of the equipment section, production division, of PAW, and previously with Amerada Petroleum Corporation and Barnsdall Oil Company.

South Louisiana

Shallow Producer Listed For Vermilion Parish

Phillips Petroleum Company's Liebersat 1, Section 28-13-4e, in the Erath field, Vermilion Parish, was perforated at 7475-77 feet, and flowed a potential of 187 barrels of 30.5-gravity oil per day. Total depth is 7450 feet. The field has been producing from Oligocene at 11,378-88 feet, and this well is in the new shallow sand opened in March.

Cameron Parish: Humble Oil & Refining Company's Cameron Parish School Board B-1, Section 16-14s-5w,

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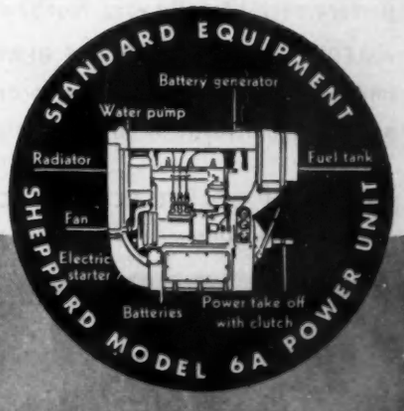

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wildcat in the Catfish Lake area, was installing heavier rig after setting casing. Operations will be resumed at 10,127 feet.

Terrebonne Parish: Union Producing Company-Fohs Oil Company's Buckley-Bourge 2, Section 1-20s-16e, Delarge field, was still trying for the world's deepest production record. The test had been hampered by salt water coming in from higher formations. Perforations at 13,530-35 feet were squeezed after a drill-stem test recovered 2970 feet of water cushion and 3960 feet of salt water. The well is now waiting on cement.

St. Landry Parish: The Texas Company abandoned Charles Swift 1, Section 14-6s-7e, Krotz Springs area, after running several tests in open hole below casing set to 10,575 feet and plugged back to 10,640 feet. Sidetracked hole was drilled to 10,874 feet after the test attempted to blowout in the first hole, but failed to find production at the same level.

Assumption Parish: Humble Oil & Refining Company abandoned Robichaux 1, 100-14s-15e, deep test at Labadieville, at 11,790 feet. A previous deeper test at 11,990 feet also was dry.

JOHN W. WHITE has been elected president and general manager of Westinghouse Electric International Company. He succeeds George H. Bucher who becomes chairman of the board. Bucher is also president of Westinghouse Electric and Manufacturing Company. William E. Knox was elected vice-president of Westinghouse Electric International Company.

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California

New Field Opened North Of Mountain View Area

A new pool north of Mountain View field, Kern County, was opened by Tide Water Associated Oil Company's Porter 24-28, SE SW SW 18-30-29. On production test the well flowed 500 barrels daily rate of 31.2-gravity clean oil with 100,000 cubic feet of gas, through a 48/64-inch choke. The accumulation is in a fault trap, production coming from about 62 feet of Wharton, or Santa Margarita sand of the upper Miocene, main producing formation of adjacent Mountain View field. Further tracing of fault controls will be necessary to determine probable extent of the new discovery, but dry holes in the vicinity suggestion limitation considerably less than a section.

Official details of a new field in Bellevue area of the Greely district, Kern County, opened by Superior Oil Company's Houghton 1, 36-35, confirm optimistic earlier reports. Initial flow was 1900 barrels of 36-gravity oil, and 2,850,000 cubic feet of gas from 6610-6570 feet, in the upper Stevens zone of Miocene age.

William C. McDuffie's Dollie 1, SW SW NW 5-32-13, in the Aroyo Grande area of San Luis Obispo County, on production test made 156 barrels daily of 15-gravity oil, from a 90-foot interval above plugged bottom of 2290 feet. Production from adjacent territory heretofore has been from other sands.

Kern County: Accumulating evidence lends conviction to beliefs that the newfound deeper pay measure of Buena Vista field will be proved one of major importance. A first outpost, more than a half-mile north, was completed with initial potential apparently a little better than the discovery well. Another stepout, about the same distance west, topped the pay 40 feet higher than the discovery well. If this third well lives up to expectations, fully 400 acres will have been proved, with indications pointing to more sizeable extensions both northwest and southeast.

Michigan

Good Show of Oil in Lake County Wildcat

Sohio Petroleum Company's State A1, S½ SW SE 28-17n-12w, Lake County, wildcat, carried a good show oil at 2760-61 feet in top of Traverse lime but 8 hours later production test showed mostly water, and drilling was continued.

Arenac County: Failures on the north offset and on wells removed one location to the northwest and west of the Deep River field discovery appear to confine the productive area of the 1944 discovered pool to a relatively small area southeast of the discovery. Production has been established a half mile southeast.

Bay County: United Driller's Arms 2, N½ NW SE 7-14n-6e, southeast offset to the Hampton-Essexville pool discovery, flowed 165 barrels natural from Dundee at 2849 feet. This field development has increased prospects of oil de-

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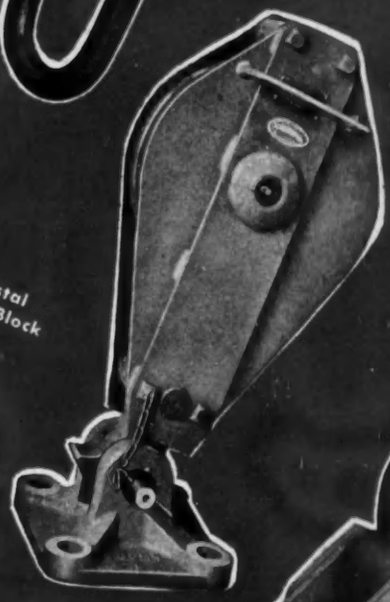

Pedestal Sheave Block

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velopment in Saginaw Bay waters. The conservation department recently obtained an opinion that the department has authority to lease lake and bay-bottom. The offset development will bring locations involving submerged property.

Glenn Bish of Grand Rapids, manager of Ohio Oil Company's Michigan producing division, and Edward J. Bouwsma of Holland, president of the Old Dutch Refining Company, have been named to 3-year terms on the Michigan Oil Advisory Board, starting June 1.

☆

DONALD L. NORLING is now in Tulsa as district geologist for Devonian Oil Company.

Rocky Mountain Area

Tests Slated for Two Untested Structures

Pacific Western Oil Corporation is spudding No. 1, SE NE SE 24-31n-81w, Tensleep test of the Two Bar structure, Natrona County, Wyoming, 18 miles southwest of Casper, on acreage assembled by Frontier Refining Company. Contract was let to Manning & Brown, and the objective Tensleep is expected around 3000 feet. Two Bar is part of the Bates Hole anticline and has 200 feet of closure with 1280 acres within the closing contour. Surface formation is Wall Creek sand.

Barren Butte: Continental Oil Company has let contract to drill Christiana 1, NE SE NW 32-27n-92w, to Manning & Brown for a test of Barren Butte, 6 miles northwest of Lost Soldier. It will test the Wasatch sands.

Sand Draw Tensleep: Sinclair Wyoming Oil Company is spudding Unit 1, SW NW NW 14-32n-95w, Tensleep test in the Sand Draw field, Fremont County. Sand Draw is a gas field, producing from the Frontier around 2300 to 3600 feet, and supplying gas to Wyoming and Nebraska towns.

Garland: General Petroleum Corporation's Nauser 1, NE 53-56n-97w, Tensleep test in the Garland field, Big Horn County, Wyoming, encountered 3520 feet of water in the Tensleep on drill-stem test, open 30 minutes, from 4596-4635 feet, after drilling to 4735 feet. Nauser 1, ½ mile southeast of the company's Howell 1, Tensleep discovery at Garland, which swabbed 265 barrels of clean oil in 15 hours, is producing from the Tensleep at 4315 feet.

Toole County: Husky Refining Company is spudding Rankin 1, NW SE SE 8-36n-1e, on the Kicking Horse structure, Toole County, Montana, northeast of the Kevin-Sunburst field.

Southwest Cut Bank: Hannah-Porter's Marceau 1-A, NW SE NW 3-31n-6w, wildcat test in the Southwest Cut Bank area, Pondera County, Montana, encountered 2700 feet of water between 3045-3052 feet, in a sand appearing to be the equivalent of the oil-producing Cut Bank sand in the Cut Bank field.

WESTERN CANADA

Southern Alberta Plains Well in Madison Limestone

A promising strike of 32.7-gravity oil was made last week in the Madison limestone at Pacific Oil & Refining Company's Twin River 1, lsd 13 2-2-20w4th, on the Southern Alberta Plains seven miles north of the Montana Border.

The well reached the Madison at 3913 feet, set 5½-inch casing at 3915 feet, and drilled on to 3927 feet, 14 feet into the Madison. Before drilling in, a switch was made from rotary to cable tools. By 3927 feet, about 3 feet of oil-saturated porous lime had been penetrated, and fluid had risen around 500 feet in the hole. Pump was being installed. The well is in an area in which four wells were drilled in past years, most promising being Western Drilling Company's No. 1 ¼ mile west, which in intermittent operation since 1937 has produced 2034 barrels of oil from the top of the Madison.

Major Oil Ltd's Major Taber 1, 129-9-17w4th, on a structural high 4½ miles west of the Taber field, has halted coring at 3251 feet, 15 feet in the Taber sand, and will test. Drill-stem test at 3248 feet showed a gas flow at the rate of 6,000,000 feet blowing a mist of heavy black oil. Coring from 3248 to 3251 feet showed good saturation of black crude.

☆

E. L. DAVIS, formerly assistant director of Production for PAW District 5 at Los Angeles, has been made acting director. Lawrence Vander Leck, who has been director of production has resigned. Davis was a petroleum engineer with The Texas Company at Long Beach before he joined PAW a year and a half ago.

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CALIFORNIA WILDCATS

Kern County—Failures: Murvale Oil Co.'s 87, ne se se 10-32-23, Midway-Sunset area, abnd 4235 ft.

Richfield Oil Corp.'s Tejon B-23-6, ne sw nw 6-11-18, Tejon area, abnd 5579 ft.

Standard of Cal.'s 5-4, ne se nw 21-28-27, Kern Front area, 115 ft perf 2870 ft, abnd 2875 ft.

Kern County—Discovery: Superior Oil Co.'s Houghton 36-35, sw ne sw 35-29-26, Bellevue area, 3 mi sw Greeley field, flow 1900 bbls 36-gr, 2,850,000 gas, 32/63-in, 550/0, perf 6570-6610 ft, td 8761 ft.

San Joaquin County—Failure: Richfield Oil Corp.'s East Stockton 2, ne nw ne 6-1-9, Stockton area gas test, Base Valley Springs to Cretaceous 1253 ft, abnd 6376 ft.

CALIFORNIA OUTPOST

Kern County—Extension: Tide Water's Porter 24-18, se sw nw 18-30-29, north of Mountain View, fault trap, flow 500 bbls 27-gr, 100,000 gas, 48/64-in, perf 4388-4450 ft, Wharton zone 4390 ft, td 4452 ft.

CALIFORNIA NEW PAY TEST

San Luis Obispo—Discovery: Wm. C. McDuffie's Dollie 1, sw sw nw 5-32-13, Arroyo Grande area, pump 169 bbls 14.8-gr oil, 16 bbls wtr, 91 ft perf 2290 ft, td 3612 ft, pb 2290 ft.

ILLINOIS WILDCATS

Clinton County—Failure: Schiermann's Timmermann 1, nw ne se 34-3n-4w, abnd 1062 ft.

Edwards County—Failure: Skelly's Bass 1, ne se ne 17-2s-14w, abnd 3157 ft.

Hamilton County—Failure: Kingwood Oil et al's Swader 1, ne ne ne 2-5s-7e, abnd 3605 ft.

Jasper County—Failure: Kingwood Oil's Flinn 1, nw nw nw 8-6n-8e, abnd 3114 ft.

Jefferson County — Failures: Bell Bros.' Minor 1, sw ne 25-1s-3e, abnd 2951 ft.

Magnolia's Bullock Unit 1, nw nw se 34-2s-2e, abnd 2838 ft.

Montgomery County—Failures: Cassens' Marburger 1, se sw sw 6-7n-5w, abnd 655 ft.

Cassens' Leo Marburger, nw se se 31-8n-5w, abnd 695 ft.

Richland County—Failure: Kingwood Oil's Cutshall 1, nw nw se 14-3n-10e, abnd 3254 ft.

INDIANA WILDCAT

Posey County—Failure: Nat. Assoc. Pet.'s Elliott 1, se se se 23-5s-14w, abnd 3152 ft.

KANSAS WILDCATS

Barber County—Failures: Great Lakes Carbon's Hastings 1, nwc ne 1-31s-15w, Miss 4359 ft, Vi 4431 ft, Simp 4559 ft, Arb 4623 ft, abnd 4650 ft.

Champlin's Skinner 1, se se se 11-32s-15w, Miss 4717 ft, Vi 4958 ft, Simp 5048 ft, Arb 5165 ft, abnd 5200 ft.

Butler County—Failure: Vickers' Entz 1, ne ne sw 28-24s-3e, Cong 2785 ft, Miss 2821 ft, abnd 2896 ft.

Cowley County—Failure: Grallup & McNish's Hankins 1, se nw nw 22-34s-5e, Miss 3069 ft, abnd 3085 ft.

Marion County—Failure: Ingling Drlg.'s Funk 1, swc 23-19s-2e, Simp 3036 ft, abnd 3132 ft.

Pawnee County — Failure: Continental's Browne 1, nec 20-21s-20w, Miss 4268 ft, Lans 2780 ft, Arb 4653 ft, abnd 4913 ft.

Russell County—Discovery: Gaugh-Davis' Claussen 1, sw sw sw 27-12s-14w, Lans 3133 ft, perf 18 shots 2845-61 ft, 1000 gals acid, pump 215 bbls.

KENTUCKY WILDCATS

Henderson County—Failure: Nat. Assoc. Pet's Barrett 1, 22-P-23, abnd 2675 ft.

McLean County—Failure: Sohio's Conley 1, 5-M-27, abnd 2230 ft.

Union County—Failure: Sohio et al's Hooper 1, 10-N-18, abnd 830 ft.

SOUTH LOUISIANA WILDCATS

Calcasieu Parish—S. Lake Charles Discovery: Continental's Prairie Land & Canal Co. 1, 310 s 330 e of nwc 2-11s-9w, in East Moss Lake area, perf 10,410-20 ft, flow 97.20 bbls 53-gr, 10/64-in, 12,037/1, td 11,325 ft.

Iberia Parish—Failure: Tide Water's Miami Corp. 1, 1980 n 660 e of swc 9-15s-6e, Shark Island area, abnd 11,990 ft.

St. Landry Parish—Failure: Texas Co.'s Chas. Swift 1, 660 s&w of nec 14-6s-7e, 2½ mi ne Krotz Springs, sso 10,575-648 ft, abnd 10,874 ft.

MICHIGAN WILDCAT

Huron County—Failure: C. W. Teater's Moran 1, e½ se nw 8-17n-14e, Dundee 2150 ft, abnd 2331 ft.

NEW MEXICO WILDCAT

Eddy County—Failure: Martin Yates Jr. et al's Wright 1, nw nw se 29-18s-29e, elev 3472 ft, salt 350-784 ft, abnd 3625 ft.

EAST TEXAS WILDCATS

Hunt County — Failure: Hunt Oil Co.'s Denton 1, 660 ft out nwc 533.76-ac tr and Hoard Claybrook-John Blocker sur, elev 563 ft, Woodbine 4088 ft, Georgetown 4535 ft, abnd 5625 ft.

Navarro County—Failure: F. W. Willson et al's Sheppard 1, 1934 ft fr sw 330 ft fr nwl, E. P. Gaines and Chism sur, elev 543 ft, Woodbine 1065 ft, Buda 1300 ft, Del Rio 1330 ft, Georgetown 1423 ft, Paluxy 1923 ft, abnd 2511 ft.

EAST TEXAS NEW PAY TEST

Anderson County—Concord Failure: Magnolia's Horwitz 1, 4500 ft ewl 3200 ft snl, J. B. McNeely Lge, elev 630 ft, Pecan 3590-3735 ft, Austin 4510-4782 ft, Glen Rose 5345 ft, stray anhydrite 5365 ft, Georgetown (out of place due to freak structure) 5530 ft, salt 6010 ft, abnd in solid salt 6327 ft.

NORTH TEXAS

Archer County: T. V. Gorman et al's J. H. Hilbers 1, 700 ft nsl 500 ft ewl sec 95, blk 4, Clark-Plumb sur, lcn 1200-ft test.

Peery-Woody et al's C. D. Prideaux 1, 660 ft out of m/s/sw cor, Robt. Crossman sur A-65, lcn 1000-ft test.

Cooke County: Batson Oil Co.'s Henry Zimmerman 1, 330 ft snl 800 ft wel A. Van Slyke sur A-1076, lcn 2000-ft test.

King County: Ohio Oil Co.'s W. R. Ross 1, 2310 ft nsl 660 ft ewl sec 24, R. B. Masterson sur, lcn 6800-ft Ellenburger test.

Wichita County: Akin-Dimock & Sloan-Zook Co.'s P. G. Krohn 1, 1300 ft snl 300 ft ewl blk 289, Waggoner Colony Subdiv, lcn.

NORTH TEXAS OUTPOSTS

Archer County—Lake (Little Wichita) Extension: Phillip's Wilson-Crory 1, 660 ft snl 2470 ft wel ATNCL sec 109, mile nw outpost, elev 996 ft, Bend 4860 ft, Ellen 5302 ft, flow 244 bbls, 42.1-gr, ⅜-in, perf 4868-78 ft, td 5724 ft, pb 4957 ft.

Jack County—Ellis Extension: Hanlon & Buchanan's Ellis-DuBose 1-E, 467 ft out nwc sec 4 and 347.21-ac tr, J. W. Williams sur A-877, mile s by w outpost, elev 1103 ft,

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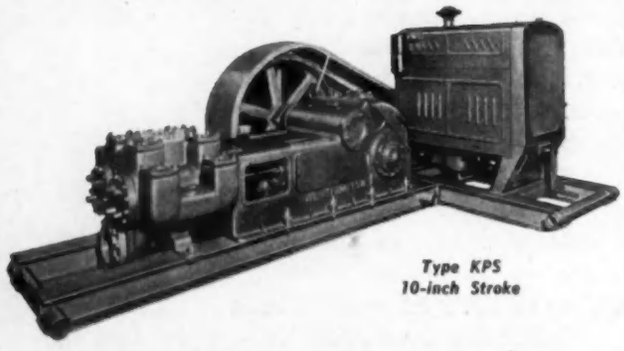

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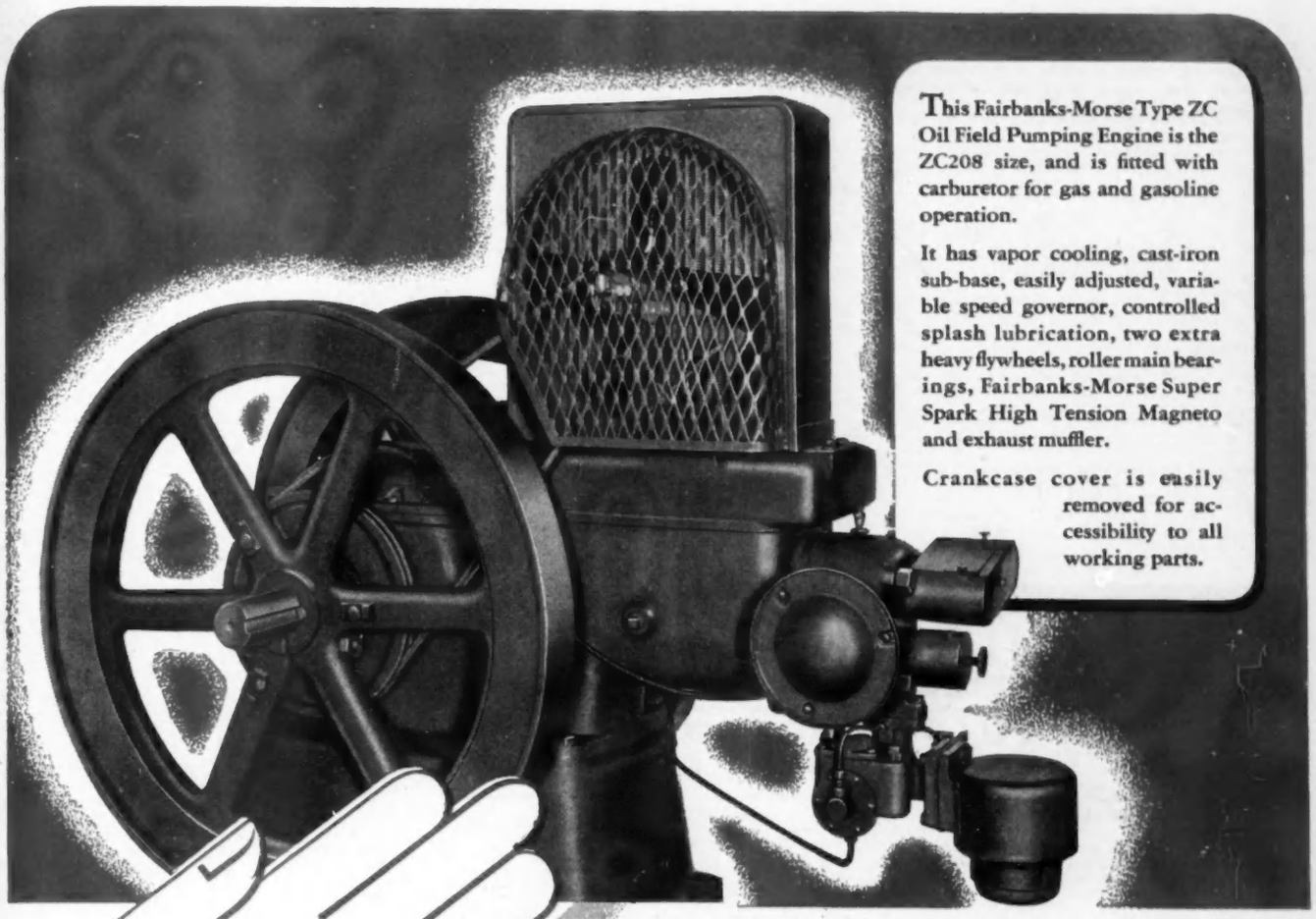

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Bend 4696 ft, flow 511 bbls 43-gr, ¼-in, 3000 gals acid 4700-23 ft.

NORTH TEXAS NEW PAY TEST

Wichita County—Airport Discovery: Consolidated Oil Co.'s Laukhuf 3, 467 ft out nec blk 5, Cherokee CSL sur, elev 974 ft, KMA lime 4231 ft, Ellenburger 5388 ft, pump 15 bbls 40-gr oil, 15 bbls wtr, Strawn perf 3833-44 ft, td 5481 ft, pb 3900 ft.

NORTH TEXAS WILDCATS

Archer County—Failures: Chambers & Humphrey's Tubeville 1, 550 ft snl 250 ft wel blk 38, Jefferson CSL, abnd 1134 ft.

Peery-Woody-Meredith Dr. Co.'s Prideaux 2, 2300 ft nsl 250 ft wel, Robt. Crossman sur A-65, abnd 835 ft.

Clay County—Oil Discovery: Bridwell Oil Co.'s Bridwell River Ranch 2, 467 ft out swc blk 27, Word & Halsell sur, 3 mi w by s Halsell field, elev 992 ft, flow 386 bbls, ¼-in, Strawn 4745-70 ft.

Clay County—Failure: Nixon Pet. Co.'s Wells 1, 200 ft ewl 200 ft nwl blk 32, Bacon sur, abnd 704 ft.

Cooke County—Failure: Texas Co.'s Briscoe 1, 990 ft wel 815 ft snl of 110-ac lse, J. M. Bailey sur A-115, abnd 2511 ft.

Hardeman County—Oil Discovery: Humble's O. H. Dodson 1, c se ne H&TC 49, blk 10, 3½ mi nw Chillicothe, elev 1405 ft, Canyon lime 4245 ft, granite-wash 4906 ft, pump 19 bbls 44-gr, 19 bbls wtr, 2500 gals acid, Canyon 4248-55 ft, td 7301 ft.

Wichita County—Failure: W. A. Baber et al's Long 1, 2522 ft nsl 550 ft ewl (river) of E. Morrison sur A-186, abnd 1518 ft.

Young County—Oil Discovery: L. T. Burns et al's M. L. Christian 1, 1500 ft snl on el sec 255, TE&L Co. sur, elev 1122 ft, Bend 3950 ft, Marble Falls 4450 ft, Barnett 4750 ft, Chester 4787 ft, Miss 4791 ft, pump & flow 150 bbls, perf 48 shots 2584-92 ft, td 4984 ft, pb 2700 ft.

Young County—Failure: R. J. Watson et al's Taack 1, 400 ft snl 150 ft wel sec 264, TE&L Co. sur, abnd 800 ft.

WEST TEXAS OUTPOSTS

Crane County—Sand Hills Extension: Schermerhorn Oil Corp.'s McKnight 1, c sw sw PSL 27, blk B-26, 1¾ mi nw nearest Clear Fork prod, elev 2684 ft, salt 635 ft, Yates 1640 ft, lime 2650 ft, flow 214 bbls 35.7-gr, ¾-in, 11,000 gals acid, Clear Fork 4490-4710 ft, td 4757 ft.

Lubbock County: Lubbock Failure: Seaboard-T. P. Coal & Oil Co.'s Nairn 1, c se ne sec 46, blk A, 1½ mi n dormant pumper, elev 3192 ft, anhydrite 1550 ft, San Andres 3140 ft, San Angelo 4400 ft, abnd 5117 ft.

WEST TEXAS

Howard County: John B. Hawley Jr.-Northern Ordnance's Spaulding 1, nw se nw T&P Ry. 7, blk 33, T-2-N, lcn 6500-ft test.

Ward County: Stanolind's R. H. Kaufman 1-B, c w¼ of w¼ H&TC 21, blk 5, lcn 5000-ft test.

SOUTHWEST TEXAS WILDCATS

Duval County—Failure: M. E. Davis' Atlee Parr 2, 2550 fr el lse and San Andres Gr, abnd 5649 feet.

Jim Hogg County—Failure: Harrison, Achning & Daubert's J. Vela Pena 1, 330 fr s&wl 80-ac lse and blk 71 sur 574, elev 768, abnd 3226 ft.

McMullen County—Failure: Plymouth Oil Co.'s W. H. Sling et al 1, 990 fr el 330 fr sl, Betty, Seale & Forwood sur 111, abnd 3161 ft.

Starr County—Failures: Red Bank Ref. Co.'s Z. Salinas et al 1, 467 fr el 467 fr sl 320-ac lse, TT ry sur 376, A-825, abnd 2445 ft.

T. E. Stephens' M. Hinojosa et al 3, 7900 w of road 3200 e alg nl 4767-ac tr fr where it intersects nwl porc 111 th 2640 s at ra to lcn in tr sh 1, abnd 2347 ft.

Webb County—Failure: Sohio's Rbt. Sanchez 1, 990 fr wl 2310 fr nl H&OB RR sur 1146 on 2225-ac lse, elev 565.5 ft, abnd 5108 ft.

Zapata County—Failure: Gilcrease Oil Co.'s J. M. Cuellar Heirs 1, 2310 fr ne&nwl sur 248 on 640-ac tr, abnd 1419 ft.

SOUTHWEST TEXAS OUTPOST

Starr County—Rincon Failure: Continental's M. M. Garcia M-1, 330 fr N&wl 160-ac M lse, Josefa Benavides porc 91, A-41, sw of prod, abnd 4618 ft.

TEXAS GULF COAST WILDCATS

Hardin County—Beech Creek Discovery: American Republics-Houston Oil Co. of Texas' H&TC Fee 1, 44 fr sl 2350 fr el H&TC sur 189, 1½ mi se Olive Sternenberger Co. 1, elev 84.6 ft, 1st Yegua 6234 ft, perf 6234-43, 6247-52 ft, flow 273.47 bbls 36.6-gr oil, 0.2% wtr, ¼-in, 1774/1, td 6650 ft, pb 6262 ft.

Houston County—Failure: J. S. Ivy-W. T. Moran's G. M. Murray & Sons 1, 660 s 71° e of nwl 2000-ac lse, John Durst sur, abnd 5492 ft.

Wharton County—Gas Discovery: Superior of Cal.'s W. J. Hudgins et al 1, 1842 nw alg sl fr sec 102-ac tr th 330 ne at ra to lcn, J. W. Moore sur A-44, perf 3036-31 ft, flow 1,545,000 gas, ¼-in, td 8501 ft.

LOWER TEXAS COAST WILDCATS

Jackson County—Failure: S. Stewart Boyle's C. A. Barron 1, 467 fr n&el 82-ac lse being e½ 164-ac Barron tr 5300 fr sl 7000 fr el J. Heard sur, abnd 7505 ft.

Jim Wells County—Gas Discovery: Smith & Mosser's E. H. Brieger 1, 467 fr s&wl 80-ac lse blk 49 and 50 A. J. Zander farm lots subdvn, SA&MG RR sur 125, perf 2120-32 ft, 7,000,000 gas, td 5110 ft. Orig abnd and reworked.

Nueces County — Failure: Gulf's Carrie Cheeves et al 1, 3667 s alg wl Carrie Cheeves tr fr nwc same th 660 e at ra, abnd 8018 ft.

Nueces County—Dougherty Discovery: Hewit & Daugherty's Clara Bluntzer 1, 467 fr nel 1808 fr nwl 328-ac lse e½ sh G. Bluntzer partn, Juan Jose de la Garza Montemayor Gr, 19 bbls, gas lift, 36.6-gr, td 6043 ft.

San Patricio County—Failure: Crown Central Pet. Corp.'s H. A. Adams 1, 330 fr sl 330 fr el 40-ac, Geo. Paul subdvn J. J. Welder rch, abnd 6517 ft.

WEST CENTRAL TEXAS WILDCATS

Jones County—Oil Discovery: New Idria Quicksilver Mining Co.'s Kelso 1, 330 ft out nec of middle 50-ac tr T&P Ry. 25, blk 17, ⅞ mi sw Wimberly, ⅞ mi n Reddin flds, elev 1777 ft, Gunsight 2562 ft, pump 344 bbls 46-gr, acid 1000 gals Gunsight 2563-66 ft, td 2571 ft.

Jones County—Failures: C. H. Brodie, tr's Derrick 1, 1361 ft snl 330 ft ewl T&P Ry. 58, blk 18, elev 1769 ft, abnd 3193 ft.

Jones-Stasney et al's Jackson 1, 5600 ft nsl 330 ft ewl, J. McGrew sur No. 245, elev 1670 ft, abnd 2232 ft.

WEST CENTRAL TEXAS NEW PAY TEST

Stephens County—Douglas New Pay Discovery: T. P. Coal & Oil Co.'s J. E. Douglass 1-A, 358 ft wel 1179 ft nsl, Thomas Watson sur A-1242, 1⅛ miles w Brownville pool, nearest Miss prod, elev 1156 ft, Bend 3244 ft, Miss 4343 ft, flow 503 bbls, ½-in, 3817/1, 1000 gals acid 4343-62 ft.

SOUTH CENTRAL TEXAS

Lee County—Failure: W. H. Bode's Fred Woodward 1, 150 fr nec at RR th nwly at ra on 107½-ac lse, Wm. Winford sur, Carrizo 2201 ft, abnd 2324 ft.

Wilson County—Failure: Sullivan & Garnett's Florian Moczygemba 1, 467 fr nw&swl 90-ac lse in swc 7800 fr el Louis Manchaca Gr, abnd 5625 ft.

TEXAS PANHANDLE NEW PAY TEST

Hutchinson County—Failure: Phillips' Whittenburg 73, 1506 ft nsl 1264 ft ewl H&TC Ry. 63, blk 46, elev 2990 ft, abnd in dolomite and chert 7682 ft.

WESTERN CANADA WILDCATS

Southern Alberta Plains—Legend: Dominion Oil Co.'s Legend-Province 1, lsd 2 15-7-13w4th, abnd in Madison 3521 ft.

Pinhorn Dome: McColl-Frontenac Oil Co.'s No. 3-17-1-8, lsd 3 17-1-8w4th, abnd 779 ft.

The OIL WEEKLY'S TRADING POST

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CLASSIFIED ADS . . . EQUIPMENT . . . SERVICES . . . PERSONNEL

FOR SALE

■ FOR SALE: Mission Hotel furnished, possession immediately. Wonderful opportunity for oil company operating in this area. Address: Mrs. Mary Guyton, Mission Hotel, Putnam, Texas.

■ 100' seamless 40 lb. hydraulic 4½" O. D. range 1 drill pipe equipped with Hydril joints for use instead drill collars. Chas. B. King, Panhandle Bldg., Wichita Falls, Texas.

■ For Sale: Two Westinghouse Drilling Motors 15/35 H.P. complete with grids, switch boxes, control wheel and countershaft. Three Clark 80 H.P. 2 cycle engines and compressor cylinders size 20" and 14" ready operate. Condor Petroleum Company, Abilene, Texas.

■ FOR SALE: Wilson Mogul Drill-In, Clean-out Unit with 120 H.P. Waukesha Motor, and compound gear box. Mounted on all steel dual wheel semi-trailer with new 10:00 x 20 prewar tires. 65' A. type telescope mast and string of small tools. Like new and ready to go. Recommended to operate easily to 6500'. Address: Baker & Camp Company, P. O. Box 247, Breckenridge, Texas.

HELP WANTED

■ WANTED: Experienced salesman for Southern Louisiana and Oklahoma to sell well known oil field specialties for Houston concern. Address: Box 54, c/o The Oil Weekly, Houston, Texas.

■ A leading Oklahoma manufacturer of oil field equipment wishes to employ a man capable of handling work analysis and routing, time studies, and similar duties in the manufacturing section. Address M. G. McCool, American Iron & Machine Works Company, Oklahoma City, Oklahoma.

■ **WANTED: A Petroleum Engineer with field experience, for engineering development work, with a large manufacturer of oil field equipment and materials. Permanent position with good future for right man. In replying state age, education, business background, salary desired, etc. Address: Box 38, c/o The Oil Weekly, Houston, Texas.**

■ OLD and well established oil tool manufacturer desires traveling Sales Representative. Position requires experience and satisfactory acquaintance with engineering and purchasing departments of oil producing companies, particularly in Gulf Coast and Mid-Continent districts. Give full particulars in reply. Address: Box 52, c/o The Oil Weekly, Houston, Texas.

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■ CAPITAL SEEKERS: Interested in raising $25,000 or more for a legitimate project should write to Amster Leonard, Fox Building, Detroit 1, Michigan.

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■ Capable production and drilling superintendent available in fifteen days. Physically fit and sober. Valuable knowledge of oil business. Address: Box 53, c/o The Oil Weekly, Houston, Texas.

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■ Model H Cardwell with Waukesha motor in good condition. Write details including price to Box 2967, Odessa, Texas.

■ MAGNETOMETER WANTED. An Askania vertical component magnetometer, preferably with a temperature compensated magnetic system. The Mining Corporation of Canada Limited, 350 Bay Street, Toronto 1, Canada.

ADVERTISING RATES

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Regular classified advertisements for this special section, set in type this size without border, take flat rate of 7 cents per word for the first insertion and 5 cents per word for each subsequent insertion of same copy. Display advertisements for this section, set in suitably larger type with ruled border, are $5.00 per inch for first insertion and $4.00 per inch for subsequent insertions. Remittance must accompany copy which should be sent to:

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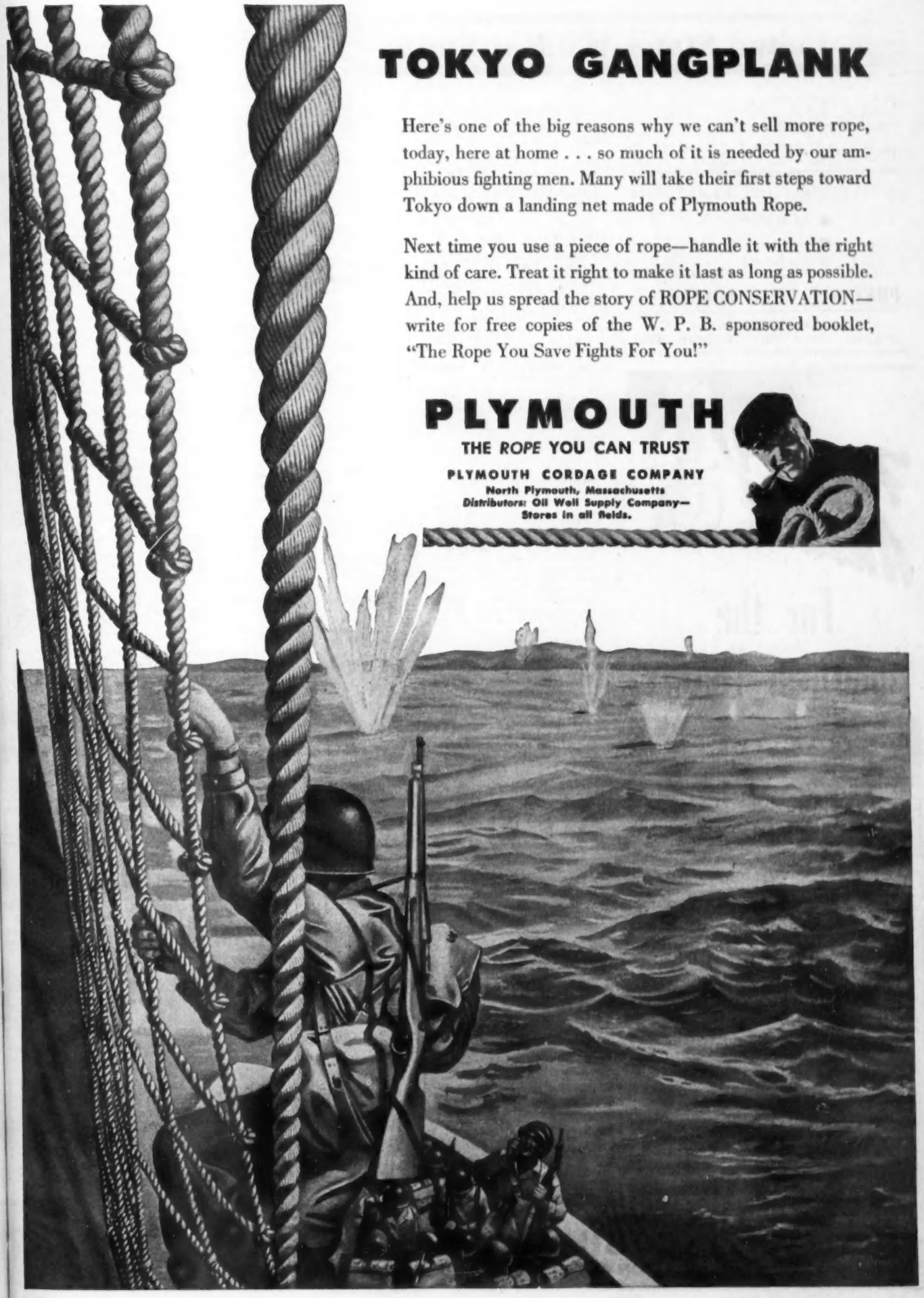

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CALIFORNIA

Kern County: Amerada's Ant Hill S. P. 67-9, ne sw se 9-29-29, Ant Hill area, lcn.

E. A. Bender's 1, nw nw ne 19-29-21, Sheep Springs area, lcn.

Standard of Cal.'s Robbins Comm. 45-35, se se nw 35-29-26, Bellevue area, mim.

F. G. Walker's Edi-Reta 1, ne nw nw 12-30-29, Edison area, lcn.

Orange County: Standard of Cal.'s Lomita-Sunset 1, sw ne nw 29-5-11, Bolsa Chica area, lcn.

Solano County: Stanolind of Cal.'s Fontana Farms 1, ne nw se 23-3-1, Suisun area gas test, mim.

Tehama County: Superior Oil Co.'s Saldubehere 1, nw ne ne 12-24-3, Corning area gas test, lcn.

Texas Co.'s Jelly Bend 18-8, sw sw sw 8-29-2, Jelly Bend area, lcn.

Ventura County: Merchants Pet. Co.'s 9, nw nw ne 1-4-20, Sespe area, lcn.

ILLINOIS

Clay County: Williams' Bostick 1, nw sw nw 18-4n-5e, lcn.

Hamilton County: Magnolia's Matheney 1, sw ne sw 19-5s-5e, dr 987 ft.

Nat'l Assoc. Pet. Co.'s Johnson 1, 10-5s-7e, lcn.

Wabash County: Morton's Kolb 1, se se sw 6-1s-12w, lcn.

Big Chief's Thompson et al 1, nw sw sw 22-1n-14w, dr 984 ft.

Wayne County: Venoble's Koontz 1, sw se sw 29-2s-8e, lcn.

Gulf's Pruitt 1, sw nw sw 15-2n-6e, lcn.

Williamson County: Sadkins' Minton 1-V, nw nw nw 1-8s-2e, lcn.

INDIANA

Wells County: Texas Co.'s Aschliman 1, se se se 7-27n-13e, lcn.

KANSAS

Barton County: Darby et al's Kruckenberg 1, se se nw 13-19s-15w, lcn.

Comanche County: Phillips' Davis 1, sec 10-33s-16w, lcn.

Ellsworth County: Bridgeport's Dolechek 1-A, swc se 23-15s-9w, lcn.

Phillips County: Texas Co.'s Armstrong 1-A, se se sw 2-5s-18w, rur.

Pratt County: Skelly's Schaw 1, nwc 4-29s-13w, lcn.

Rice County: Stanolind's Davis 1, sec 33-19s-7w, lcn.

Russell County: Nelson Dr.'s Dumler 1, nwc se 6-14s-13w, lcn.

Sedgwick County: Texas Co.'s Blackford 1, ne ne ne 24-25s-2e, lcn.

Sumner County: Sullivan's Nixon 1, c ne ne 22-30s-1w, drlg 340 ft.

Texas Co.'s Craven 1, ne ne nw 27-33s-2e, lcn.

Trego County: Phillips' Hacker 1, se se ne 12-13s-23w, lcn.

Phillips' Folkers 1, swc 31-13s-23w, lcn.

KENTUCKY

Henderson County: Yingling et al's Poole-Cummins Comm 1, 2-N-23, lcn.

SOUTH LOUISIANA

Calcasieu Parish: W. H. Cooper's E. Faratz 1, 263.5 n 271 w of sec nw se 1-8s-10w, on 40-ac tr, Buhler area, lcn 7000-ft test.

MICHIGAN

Arenac County: Frank Roush's Chantiny 1, nw nw se 13-18n-4e, rig.

Mecosta County: Sohio Pet. Co.'s Chaney 1, s½ se sw 16-13n-9w, dk.

Midland County: Sun's Jankowske 1, s½ se se 15-16n-1w, lcn.

Newaygo County: Pure's Butler 1, n½ nw nw 20-11n-11w, rig.

MONTANA

Toole County: Husky Ref'g Co.'s Rankin 1, se se sw 8-36s-1e, Kicking Horse structure, sp.

NEW MEXICO

Eddy County: Childress Roy. Co.'s State-Brown 1, c ne nw 32-20s-26e, lcn.

EAST TEXAS

Robertson County: J. A. Arphopulos et al's D. C. Bolton 1-A, 430 ft ewl 360 ft nsl of 50-ac lease, Jose M. Viesca sur No. 46, lcn.

Titus County: Humble's C. C. Searcy 1, 660 ft ewl 566 ft nsl of 57¾-ac tract and Wm. H. Gilbert sur, rur Travis Peak test.

Van Zandt County: O. W. Killam et al's Coy Giddens 1, 1230 ft ewl, 2610 ft nsl C. M. Beckett sur, on 160-ac lse, ¾-mi s Myrtle Springs, rur for Woodbine test.

WEST CENTRAL TEXAS

Callahan County: Harry Hines et al's V. J. Knuckles 1, 2200 ft snl 330 ft ewl T&P 65, blk 14, lcn 2250-ft cable test.

R. S. Miesse et al's Joel Griffin 1, 220 ft out nwc BBB&C Ry., sec 87, lcn 1400-ft cable test.

Eastland County: Kerlyn Oil Co's B. B. Maddox 1, 698 ft nsl 4264 ft ewl HT&B Ry. sec 31, A-314, ½ mi w Erath Co. line, lcn 4000-ft rotary test.

Jones County: Eltex's W. B. Adamson 1, 660 ft out swc 160¾-ac tr blk 3, S. W. Winters sur, lcn 2600-ft test.

Merry Bros. & Perini-Alder Oil Co.'s I. L. Weaver 1, 330 ft out sec T&P 6, blk 17, lcn 3000-ft test.

TEXAS GULF COAST

Brazoria County: Gulf's S. M. Allen et al 2, 5460 fr el 1701 fr sl Sterling McNeil sur A-90, 7253.83-ac lse, Allen Dome area, lcn 12,000-ft test.

Colorado County: Tide Water's D. L. Underwood 1, 574 fr nely 887 fr sely lines 218.89-ac lse and Miguel Muldoon sur 30, lcn 11,000-ft Wilcox test.

Matagorda County: Atlantic's Denman Est. 1, 1320 fr el 660 fr nl blk 12, 150-ac lse, H. Parker sur, W. Markham area, lcn 5000-ft test.

Polk County: J. Z. Werby et al's Saner Ragley Lbr. Co. 1, 330 e of el W. Reagan sur A-1040, 2960 n fr nl J. E. Bungarthen sur A-128, on Houston Co. School Ld. sur A-272, lcn.

Wharton County: H. C. Cockburn's H. P. Stockton 1, 450 fr se&nel 221-ac tr, R. Boatwright sur A-8, lcn.

SOUTHWEST TEXAS

Duval County: Frank Gravis' Frank Vaello 1, 330 fr m wly 406.7 fr m nly nl lse, n 200-ac of s 304.66 acs of Frank Vaello 815.75 acs, San Andres Gr, lcn 4000-ft test.

G. B. Parr's J. C. Ancira 8, 1944 fr n&el 513.51-ac lse, J. Pointevent sur, sect 185, lcn 3800-ft test.

Argo Oil Corp.'s N. Couling 1, 1650 fr nel 990 fr sel 640-ac lse and GB&CNG sur 175, lcn 4700-ft test.

Zapata County: Gilcrease Prod. Co.'s Cuellar Heirs 2, 330 fr nw 330 fr swl sect 248 640-ac lse, lcn 2600-ft test.

SOUTH CENTRAL TEXAS

Bell County: Brewster & Brewster's J. R. Weytek Est. 1, 330 fr s&el 154-ac lse, J. Washington sur 907, A-1079, lcn 3000-ft test.

Guadalupe County: H. R. Cullen et al's San Antonio Loan & Trust Co.'s 467 fr s&el 160-ac tr, J. A. Miller sur, lcn.

Lee County: Seaboard Oil Co. of Dela.'s R. R. Beaman 1, 1880 fr sel 467 fr sly line 503-ac lse, J. B. Taylor sur, lcn 5000-ft test.

LOWER TEXAS COAST

Hidalgo County: Navarro Oil Co.'s R. King Est. 1, 467 fr wl San Salvador Gr 1787 fr sl 160-ac tr out of Los Indios Pastr tr 9, lcn 7500-ft test.

Jim Wells County: Palmer Oil Corp.'s Dora Lee Blake 1, 330 fr sl blk 4, 2015.6 w of el Blake 2009.56-acs, 400-ac lse, L. Trinidad Gr, lcn 6000-ft test.

Karnes County: Chas. E. Frazer's E. P. Ruhman 1, 660 fr sel 860 fr swl 300.5-ac lse, W. Orton Lge A-221, lcn 7000-ft test.

San Patricio County: Great Lakes Carbon's

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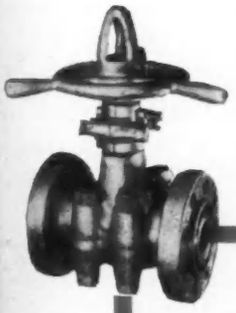

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C. A. Maedgen 1, 500 fr nel 660 fr swl 660 fr nwl 80-ac lse, M. P. & J. N. Delgado Gr, lcn 7000-ft test.

Plymouth Oil Co.'s S. F. Jackson 1, 330 fr w&nl frac sect 43-A 616.39-ac lse Taft Farm lands, lcn 6000-ft test.

Victoria County: Northern Ordnance's H. M. Rushhaupt 1, 660 fr el 2640 fr nl 343-ac lse, 1 mi n Mission Valley, lcn 12,500-ft test.

WYOMING

Fremont County: Continental's Christiana 1, ne se nw 32-27n-92w, Barren Butte, lcn.

Natrona County: Pacific Western Oil Corp.'s 1, se ne se 24-31n-81w, Two Bar structure, Tensleep test, sp.

WESTERN CANADA

Southern Alberta Plains—Foremost: British American-McColl Frontenac Oil Co.'s Foremost 1, lsd 2-33-7-9w4th, ru.

Pinhorn Dome: McColl-Frontenac Oil Co.'s No. 9-17-1-8, lsd 9 17-1-8w4th, ru.

Conrad: Imperial Oil British Dominion Oil's Conrad 2, sw lsd 3 7-8-15w4th, lcn.

California-Standard Oil Co.'s Conrad Province 2, se lsd 1 5-6-15w4th, ru.

Central Alberta Plains—Fabyan: Inland Gas & Oil Co.'s Inland 2, nw lsd 15 13-45-8w4th, elev 1996.5 ft, ru.

Alberta Foothills Belt—Moose Dome: John Grossi's Elbow Falls 2, n½ lsd 4 28-22-6w5th, lcn.

Squeaks from the Bull Wheel

In Court

"You're a cheat!"

"You're a liar!"

"Now that these attorneys have identified each other, we shall proceed with the case."

Boom

"I want a box of powder, please."

"The kind that goes off with a bang?"

"No, the kind that goes on with a puff."

Take It From There

"You'd better sober up a little before you board the train."

"Misshen lister, I've only had tee martoonies and I'm not as much under the affluence of inkahol as some thinkle may peep, and the drunker I stand here the longer I get."

Those Americans

Camping on muddy locale, several soldiers in Italy appropriated a stack of straw as flooring for their tents.

Later a gesticulating Italian appeared and demanded payment. Unable to make themselves understood, one of the soldiers took a scrap of paper and carefully wrote something on it. This satisfied the complainant for the moment, but the next day he was back.

This paper had been inscribed, "Good for 100 rides on the merry-go-round at Coney Island."

One's Enough

"So you love my daughter?"

"Love her? Why, for one soft glance from her sweet eyes I would hurl myself off a lofty cliff."

"Well, I forbid the marriage. I'm something of a prevaricator myself and one is enough in a small family like ours."

Get It?

His name was Practice and he met a gal named Perfect.

Case of Nerves

Nervous bridegroom: "Is it customary to cuss the bride?"

Clergyman: "Not yet, son."

Strategy

"What are you going to give your husband for a birthday present?"

"Oh, a hundred cigars."

"What did you pay for them?"

"Nothing! For the last few months I have taken one or two from his box daily. He hasn't noticed it and will be delighted with my tact in getting the kind he always smokes."

Tall Tale—Wildlife Department

Tigers had been ravaging a village and the terror-stricken natives sent for the nearest white man to assist them.

This man was a crack shot, and had never been known to miss. His method was to tie a goat to the foot of a tree at dusk, climb the tree, and when the tigers came for the goat, fire at the flash of their eyes. In the morning they would be found dead, shot straight between the eyes.

He followed his usual procedure the first night, but although he fired several shots, when the day dawned the goat was gone but there were no dead tigers.

This happened on two succeeding nights. Perturbed, he took a huge torch with him on the fourth night, instead of firing at the flashing eyes, switched on his torch and saw, to his amazement six tigers advancing in pairs, each with one eye closed.

Always Willing

The solicitous visitor approached the soldier and asked: "My good man, you are now willing to die for your country, aren't you?"

"Naw," he grunted, "but I'm willing to help some Jap die for his."

Made Good

Black Market Dealer: When I was a little boy the height of my ambition was to be a pirate.

Customer: You're lucky — it isn't everyone who can realize his boyhood dreams.

CORE ANALYSIS

QUICK AND ACCURATE RESULTS
with
RUSKA CORE ANALYSIS INSTRUMENTS

- **PERMEABILITY**
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EARLY DELIVERY

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Whatever size power job there is to be done, chances are that Utility Electric Power will do it, and do it with maximum efficiency and at rock bottom cost.

Everywhere throughout the petroleum industry you will see Utility Electric Power being used with outstanding success — for pumping, for pipeline operations, for refining, for butadiene plants, for drilling, and for many other purposes. The reason is, Utility Electric Power has proved to be the top-flight all-around power for the petroleum industry.

Investigate the advantages of Utility Electric Power when needing Power to help produce more oil and gasoline for Victory. Consult the commercial engineer of your Utility Electric Power company. He will help you in every way possible.

Utility ELECTRIC POWER

Use Utility Electric Power!

PETROLEUM ELECTRIC POWER ASSOCIATION

Box 1498, Oklahoma City, Oklahoma

Notes for the Equipment Buyer and User

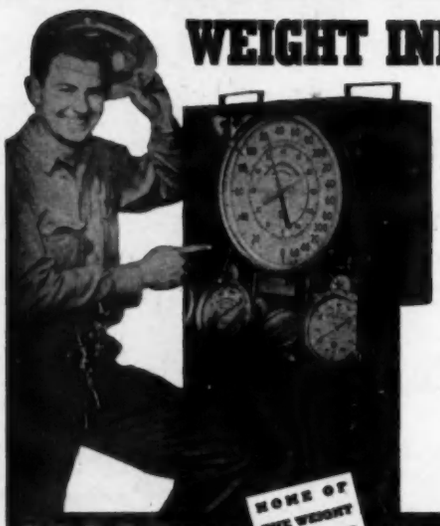
Steel Buildings for Field Activities Again Available

PAW announces that manufacturers of prefabricated steel buildings may resume the manufacture of such buildings by filing CMP-4B application with the Metal Building Materials Section, Building Materials Division, War Production Board.

For the petroleum operator to obtain such buildings, it is only necessary that he conform to the requirements of PAO-11 with respect to authority to erect such a building. Under PAO-11 a building which comes within the definition of lease equipment may be erected without the need to obtain any prior specific authorization. The order itself grants a blanket authorization. Priorities assistance for such a building is available in P-98-b under the regular procedure for production, that is, the AA-2X and P-1 symbol.

However, if the building is not lease equipment under PAO-11, a production operator may not erect it unless he secures specific authority from PAW to do so. To obtain such authority, the production operator should file with PAW in Washington, PAW Form 30. Priorities assistance will be assigned together with any grant of authority after application on that form.

H. F. Stover (left) receives the Army-Navy E pennant on behalf of Gaso Pump & Burner Manufacturing Company, Tulsa. Ralph Roof (right), received the E pins on behalf of employees. The award was made on May 19, in the plant at Tulsa, for "meritorious and distinguished service" in the production of war equipment and materials.



WEIGHT INDICATOR POINTS

GET FULL DRILLING INFORMATION—When you install a "Sealtite" it indicates and records weight on bit, mud pump pressure, and torque in drill pipe. Rotary table speed is indicated and recorded so you know you're drilling a better well at less cost. This master drilling instrument really controls operations instantly, accurately at all depths on any well.

MARTIN HOME OF THE WEIGHT INDICATOR DECKER CORP.

LONG BEACH, CALIFORNIA

SAN JOAQUIN VALLEY A. F. McQUISTON BAKERSFIELD, CALIFORNIA

MID CONTINENT DISTRIBUTOR REED ROLLER BIT COMPANY, HOUSTON, TEXAS

Worthington Opening New Sales Office at San Francisco

Worthington Pump and Machinery Corporation has announced the appointment of Thomas J. Kehane, of East Orange, New Jersey, as commercial vice president in charge of the corporation's Pacific Coast activities. He will make his headquarters in new offices to be opened July 1 at San Francisco. He will likewise supervise the territory served by its Salt Lake City district office.

Kehane started with the organization as a 14-year-old office boy in July, 1915. He has been with the corporation continuously ever since, for the last 19 years in the sales department. He has advanced through various positions to his most recent assignment as manager of New Jersey sales and assistant manager of the New York district office.

Sterling Packing & Gasket Employs Parkin for Research Post

Sterling Packing & Gasket Company, Houston, announces appointment of J. E. Parkin as chief engineer in charge of research. Parkin graduated from North Carolina State College in 1939, and has done development and research work for the New Bedford Rayon Company, and Calco Chemical Division of American Cyanamid Company. For the past year, Parkin has been in the technical service department of Pan American Refining Corporation at Texas City.

Carnegie-Illinois Steel Exonorated of Fraud Charge

"We are happy to have the public know that the unfair and unsubstantiated accusations made by the Truman Committee of the delivery by Carnegie-Illinois of defective plates have been completely refuted," J. L. Perry, president of Carnegie-Illinois Steel Corporation, United States Steel Corporation subsidiary, said in commenting upon acquittal May 23 of Carnegie-Illinois in the criminal suit prosecuted by government against it in the federal court at Pittsburgh. "No witness," Perry continued, "testified either before the Truman Committee or before the federal court at Pittsburgh that any defective steel plates were ever supplied by Carnegie-Illinois Steel Corporation from Irvin Works or elsewhere."

"About a year ago," he added, "when indictments were found against Carnegie-Illinois Steel Corporation relative to alleged false reports of tests of steel plates at Irvin Works, I stated that Carnegie-Illinois was confident that when it was afforded the opportunity to present in court the full facts, the outcome would be complete exoneration. Such statement reflected my firm conviction that none of the plates supplied by Irvin Works were either defective or inferior, and that any irregularities in test reports which might have occurred concerned relatively unimportant variations from the specifications. My statement has since been proved to have been entirely accurate.

"After an exhaustive three-weeks trial, just concluded before Judge Robert M.

Wartime conservation—mud lines

Information supplied by "The Oil Weekly"

Vibration, fluid pound, imparted to the mud stream by the pumps as it starts on its way to the derrick and thence to the bottom of the oil well, imposes heavy strains on the pipe lines at every change of direction, resulting in premature failure of threaded joints and fatigue of the metal itself at nodal points.

By cutting the line at the point of change from horizontal run to vertical riser or standpipe in the derrick, and inserting short sections of high-pressure rotary hose, the vibration of the line is snubbed before it can reach the riser, while the two connecting links of heavily reinforced hose yield sufficiently at hydraulic pressure peaks to absorb the crest of the pressure wave, passing the fluid on to the standpipe in more uniform flow, and greatly extending the life of the pipe gooseneck and other portions of the mud system.

Sectioning the mud line with short elastic inserts of some sort, while adding to initial cost by the amount of hose and couplings, pays dividends in extended pipe life and reduction in down time for mud line repairs or replacement—and thus adds toward the net gain in wells drilled in the press for more oil and extended reserves.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

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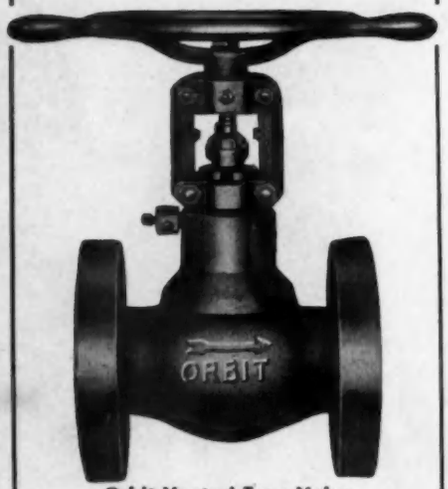

Orbit Venturi Type Valve

This valve can be furnished thru all fabricators of Xmas Trees or thru any of your local supply stores at a price comparable to that of leading plug valves **YET** this valve requires no lubrication to effect a seal.

See Pages 2194 to 2211 in 1944 Composite Catalog

Specify

ORBIT VALVES

OIL WELL IMPROVEMENTS COMPANY

TULSA OKLAHOMA

E. F. GAHAN, Export Rep.
500 Fifth Ave., New York 18, N. Y.

Gibson in the United States District Court at Pittsburgh, such complete exoneration has been obtained. Today the jury in that case acquitted Carnegie-Illinois of the charges contained in 47 counts of an indictment that it had falsely certified tests on certain plates furnished to or for various government agencies. During the trial Carnegie-Illinois introduced evidence to establish the actual heat numbers of the steel involved in each of these 47 counts, as well as evidence to prove that all of the steel in question had in fact been properly tested and had met the chemical and physical requirements of the contract specifications.

"Judge Gibson directed a verdict of acquittal on another indictment charging Carnegie-Illinois with the destruction of pertinent records. The government was unable to present any evidence connecting Carnegie-Illinois with a destruction of records."

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